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ANNUAL REPORTS, WAR DEPARTMENT

FISCAL YEAR ENDED JUNE 30, 1908

REPORT OF THE CHIEF OF ENGINEERS U. S. ARMY

1908

IN THREE PARTS

PART II

WASHINGTON
GOVERNMENT PRINTING OFFICE
1908

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60TH CONGRESS, 2d Session } HOUSE OF REPRESENTATIVES { DOCUMENT No. 1052

ANNUAL REPORTS, WAR DEPARTMENT

FISCAL YEAR ENDED JUNE 30, 1908

REPORT OF THE

CHIEF OF ENGINEERS

U. S. ARMY

1908

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APPENDIXES

TO THE

REPORT OF THE CHIEF OF ENGINEERS,

UNITED STATES ARMY

(CONTINUED).

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APPENDIX L.

IMPROVEMENT OF RIVERS AND HARBORS IN THE NORFOLK, VIRGINIA, DISTRICT.

REPORT OF MAJ. JOSEPH E. KUHN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Harbor at Norfolk and its approaches, Virginia.
2. Western Branch of Elizabeth River, Virginia.
3. Hampton Roads, Virginia.
4. Nansemond River, Virginia.
5. Pagan River, Virginia.
6. Appomattox River, Virginia.
7. Harbor at Cape Charles City, Virginia.
8. Waterway from Norfolk, Virginia, to the sounds of North Carolina.
9. Inland water route from Norfolk, Virginia, to Albemarle Sound, North Carolina.
10. Perquimans River, North Carolina.
11. Blackwater River, Virginia.
12. Meherrin River, North Carolina.
13. Roanoke River, North Carolina.
14. Removing sunken vessels or craft obstructing or endangering navigation.

ENGINEER OFFICE, UNITED STATES ARMY,
Norfolk, Va., July 20, 1908.

SIR: I have the honor to transmit herewith my annual report upon the works of river and harbor improvement now in my charge for the fiscal year ended June 30, 1908.

Very respectfully, your obedient servant,

JOSEPH E. KUHN,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

L 1.

IMPROVEMENT OF HARBOR AT NORFOLK AND ITS APPROACHES, VIRGINIA.

(A) GENERAL IMPROVEMENT.

During the fiscal year ending June 30, 1908, work was carried on under this improvement at three separate points in accordance with the adopted project, as follows:

(*a*) Dredging on Berkley flats over a triangular area to a depth of 25 feet at mean low water.

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(*b*) Removal of old bridge approach on the south side of the Eastern Branch of the Elizabeth River, below the Norfolk and Western Railroad bridge.

(*c*) Dredging in the Eastern Branch for the purpose of widening the channel to project width between the Campostella highway and the Norfolk and Western Railway bridges to 22 feet depth at mean low water.

Work at all three sections was covered by a single contract with the Norfolk Dredging Company at unit prices stated below.

The contractor commenced work on the Berkley flats on October 11, 1907, and completed the work at this point on April 8, 1908. The work accomplished consisted in the removal of 84,726 cubic yards, scow measure, from a triangular area of about 6.6 acres, bounded by a line 75 feet outside of the established pierhead line and the 25-foot contours on the other two sides. The contract price for this work was 21½ cents per cubic yard, scow measurement. The material was mainly a stiff clay, necessitating the use of an orange peel bucket in dredging. The excavated material was towed to the established dumping ground on Willoughby Bank, east of the Ripraps, a distance of about 14 miles, and there deposited in accordance with the terms of the contract. All dredging on Berkley flats to secure an anchorage area of 25 feet depth at low water is now completed under the adopted project.

Work on the removal of the old bridge approach on the south side of the Eastern Branch was commenced December 16, 1907, and completed on December 24, 1907. The work accomplished resulted in the removal of 2,309 cubic yards of material place measurement, at a price of $1.75 per cubic yard. The bridge approach was cut away for a length of about 100 feet to the established pierhead line and to a depth the same as that of the adjoining bottom. The material consisted of two dry rubble retaining walls formed on an embankment of clay and oyster shells overlying a mattress of logs and sawmill edgings. The excavated material, except the stone which was put ashore, was towed to the established dumping ground on Willoughby Bank, about 2 miles east of the ripraps and about 15 miles from the work.

Work between the Campostella highway and Norfolk and Western Railway bridges was commenced on February 24, 1908, and terminated for lack of funds on May 20, 1908. The work accomplished consisted in the removal of 153,974 cubic yards of material, scow measure, at a price of 9½ cents per cubic yard. Excavation was carried to a depth of 22 feet below mean low water. The dredged area covered a strip about 2,600 feet long and 135 feet wide on the north side of the channel and areas about 2,200 feet long and 70 feet wide, and 400 feet long by 45 feet wide on the south side of the channel. On the north side the channel has been excavated to within 75 feet of the established pierhead line in conformity with the adopted project, but on the south side the available funds did not suffice to secure the full width of channel where a strip 20 feet wide, estimated to contain 30,000 cubic yards scow measure, remains to be removed.

The material excavated was mud and was towed to and dumped at the established dumping ground on Willoughby Bank, a distance of about 16 miles.

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The Norfolk Dredging Company completed its contract on time, but final settlement had not yet been made at the close of the fiscal year, pending final surveys of the dredged areas.

Money statement.

July 1, 1907, balance unexpended	$41,485.59
July 1, 1908, received from sales	10.50
	41,496.09
June 30, 1908, amount expended during fiscal year for works of improvement	37,632.71
July 1, 1908, balance unexpended	3,863.38
July 1, 1908, outstanding liabilities	3,453.20
July 1, 1908, balance available	410.18
Amount (estimated) required for completion of existing project	5,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	5,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

(B) HOSPITAL POINT.

There were no operations and no expenditures during the fiscal year on this improvement. For information as to the project, reference should be made to the current summary.

On June 10, 1908, authority was granted to apply the available unexpended balance of the appropriation in redredging a portion of the area south of Hospital Point and adjacent to the pierhead line where shoaling had occurred, and circular proposals had been issued at the close of the fiscal year.

Money statement.

July 1, 1907, balance unexpended	$6,392.39
July 1, 1908, balance unexpended	6,392.39

(C) THIRTY-FOOT CHANNEL.

This is a new project, adopted by Congress March 2, 1907, under a continuing contract. For further information as to the project reference should be made to the current summary.

Under a contract with the Norfolk Dredging Company, work was commenced on the removal of the shoals at the mouth of the Eastern Branch on October 4, 1907, and completed on February 21, 1908. The work accomplished consisted in dredging a channel 500 feet wide and 25 feet deep at low water through a shoal at the mouth of the Eastern Branch from a point below the Norfolk Ferry slips to a point opposite the Clyde Line wharves. A total of 202,565 cubic yards, scow measure, was excavated at a price of 10¼ cents per cubic yard. The material was soft mud and was towed to and dumped at the established dumping ground on Willoughby Bank, a distance of about 14 miles.

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Under a contract with the Coastwise Dredging Company, work was commenced on October 24, 1907, between Lambert Point and Craney Island light on the new ship channel.

This contract is a continuing one and covers an estimated yardage of 7,000,000 cubic yards in a channel about 9 miles long from Sewall Point to the junction of the Southern and Eastern branches. The contract price is $7\frac{3}{10}$ cents per cubic yard scow measure.

The work accomplished during the year resulted in the excavation of 914,535 cubic yards, scow measure, in the vicinity of Lambert Point. Dredging was carried on over an area of about 35 acres to an average depth of about 28 feet. The material consists of a fairly stiff mud overlying a bed of clay, which will necessitate going over the area again with a changed bucket.

The contractor has employed but one dredge on the work to date, but has maintained a rate of progress only slightly below that required to complete his work on time. It is expected that an additional dredge will be put to work in the near future.

The excavated material is towed to and dumped at the established dumping ground on Willoughby Bank, an average distance of about 10 miles.

Money statement.

July 1, 1907, balance unexpended	$281,017.16
Amount appropriated by sundry civil act approved May 27, 1908	125,000.00
	406,017.16
June 30, 1908, amount expended during fiscal year for works of improvement	87,783.07
July 1, 1908, balance unexpended	318,234.09
July 1, 1908, outstanding liabilities	9,825.38
July 1, 1908, balance available	308,408.71
July 1, 1908, amount covered by uncompleted contracts	500,309.23
Amount (estimated) required for completion of existing project	725,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	100,000.00

APPROPRIATIONS.

Improving harbor at Norfolk, Va.:	
August 14, 1876	$85,000.00
June 18, 1878	50,000.00
March 3, 1879	75,000.00
June 14, 1880	50,000.00
March 3, 1881	75,000.00
August 2, 1882	75,000.00
July 5, 1884	75,000.00
August 5, 1886	187,500.00
August 11, 1888	60,000.00
September 19, 1890	150,000.00
July 13, 1892	150,000.00
August 18, 1894	100,000.00
June 3, 1896	100,000.00
June 13, 1902	30,000.00

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Improving harbor at Norfolk, Va.—Continued.	
March 3, 1903	$183,957.00
March 3, 1905	40,000.00
March 2, 1907	319,825.00
May 27, 1908	125,000.00
Allotment of November 23, 1904, from act of April 28, 1904, for "Emergencies in river and harbor works"	30,000.00
Improving Elizabeth River, Virginia, July 7, 1898	360,000.00
Total	2,271,282.00
Received from sales	21.21
Total	2,271,303.21
Amount turned into surplus fund of the Treasury from appropriation of July 7, 1898	483.58
Aggregate	2,270,819.63

CONTRACTS IN FORCE.

GENERAL IMPROVEMENT.

With Norfolk Dredging Company, for dredging and removing a portion of an old bridge approach, dated October 2, 1907; approved October 14, 1907; date for commencing work, December 17, 1907; date for completion of work, December 17, 1908. Prices: Section "A," 9$\frac{4}{10}$ cents per cubic yard, scow measurement; section "B," $1.75 per cubic yard, place measurement; section "D," 21½ cents per cubic yard, scow measurement.

THIRTY-FOOT CHANNEL.

With Coastwise Dredging Company, for dredging, dated August 6, 1907; approved August 22, 1907; date for commencing work, October 22, 1907; date for completing work, April 22, 1912. Price: 7$\frac{4}{10}$ cents per cubic yard, scow measurement.

With Norfolk Dredging Company, for dredging and removing a portion of an old bridge approach, dated October 2, 1907; approved October 14, 1907; date for commencing work, December 17, 1907; date for completing work, December 17, 1908. Price: Section "C," 10$\frac{4}{10}$ cents per cubic yard, scow measurement.

COMMERCIAL STATISTICS.

The following statistics relative to the commerce of the harbor of Norfolk, Va., during the calendar year 1907, were compiled from statements furnished by parties engaged in making shipments over this waterway:

Articles.	Amount.	Value.	Articles.	Amount.	Value.
	Tons.			*Tons.*	
Brick	17,450	$53,850.00	Wood	63,600	$116,640.00
Cement	5,600	47,600.00	Fish scrap	600	12,000.00
Clay	25,075	8,450.00	Steel	13,836	3,874.08
Coal	4,671,309	13,408,238.75	Scrap iron	477	64.39
Coke	246,555	739,665.00	Tile, drain	180	900.00
Corn	17,767	533,010.00	Pipe, terra cotta	2,100	14,000.00
Fertilizer	456,089	2,075,995.30	Broken stone	1,900	3,135.00
Ice	1,206	1,579.00	Shingles	480	5,000.00
Lime	650	4,875.00	Excelsior	243	2,430.00
Logs	293,873	1,346,120.00	Miscellaneous	7,371,571	562,867,825.00
Oysters	600	21,000.00			
Lumber	447,039	16,596,314.51	Total	13,643,849	597,950,881.43
Pig iron	5,709	85,225.40			

The deepest draft vessel using the channel during the year 1907 was the steamship *Amsteldyk*, drawing 28 feet, with general cargo.

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Approximate amount of freight handled by water during various years.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1888	1,914,506	1898	6,510,201
1889	2,243,087	1899	6,260,284
1890	2,384,341	1900	5,538,051
1891	2,931,751	1901	7,761,356
1892	3,427,189	1902	7,853,108
1893	3,684,727	1903	9,478,900
1894	4,545,049	1904	10,780,972
1895	5,013,185	1905	10,914,378
1896	5,986,636	1906	15,662,080
1897	9,430,526	1907	13,643,849

The total tonnage has fallen off slightly from the fiscal year previous, due, presumably, to the prevailing business relaxation and to the absence of the special stimulation of the Jamestown Tercentennial Exposition.

L 2.

IMPROVEMENT OF WESTERN BRANCH OF ELIZABETH RIVER, VIRGINIA.

No operations were carried on during the fiscal year, and no expenditures were incurred.

Since the completion of the project in 1897 the dredged channel has undergone some deterioration, both in width and depth, and some redredging is now necessary.

Money statement.

July 1, 1907, balance unexpended	$328.35
July 1, 1908, balance unexpended	328.35
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	5,000.00

APPROPRIATION.

June 3, 1896 ..... $45,000

COMMERCIAL STATISTICS.

The following statistics, showing the commerce on this river, were compiled from statements made by shippers:

Articles.	Amount.	Value.
	Tons.	
Ore, copper	17,200	$102,500.00
Truck packages	90	787.50
Miscellaneous	2,469,823	24,698,230.00
Total	2,487,113	24,801,517.50

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Approximate amount of freight handled by water during various years.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1896	211,653	1902	1,058,488
1897	244,803	1903	1,225,709
1898	346,825	1904	1,173,439
1899	576,898	1905	1,323,657
1900	(a)	1906	4,189,795
1901	1,383,105	1907	2,487,113

a Not compiled.

L 3.

IMPROVEMENT OF HAMPTON ROADS, VIRGINIA.

The only operations during the fiscal year consisted in sounding the channel as a basis for undertaking the maintenance of the channel under the appropriation provided in the act of March 2, 1907. It is proposed to call for bids early in the coming fiscal year for redredging certain portions of the channel which have undergone deterioration.

This channel is the main approach to Newport News, Va., and serves a large and important tonnage.

Money statement.

July 1, 1907, balance unexpended		$12,556.49
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$56.49	
For maintenance of improvement	83.91	
		140.40
July 1, 1908, balance unexpended		12,416.09
July 1, 1908, outstanding liabilities		.75
July 1, 1908, balance available		12,415.34
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908		12,500.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

June 13, 1902	$10,000
March 3, 1903	215,000
March 2, 1907	12,500
Total	237,500

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COMMERCIAL STATISTICS.

The following statistics were compiled from statements of shippers at Newport News, which shows the traffic during the calendar year 1907, by way of Hampton Roads to and from Newport News:

Articles.	Quantity.	Value.
	Tons.	
Coal	3,455,286	$8,469,950.70
Grain	70,083	2,242,624.00
Miscellaneous	2,844,249	500,447,160.00
Total	6,379,617	511,179,734.70

Approximate amount of freight handled by water during various years.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1901	3,736,443	1905	4,717,858
1902	2,663,660	1906	5,544,086
1903	2,826,558	1907	6,379,617
1904	4,208,781		

L 4.

IMPROVEMENT OF NANSEMOND RIVER, VIRGINIA.

The only operations during the fiscal year consisted in re-sounding the channel over certain bars at the mouth of the Western Branch to determine its condition with a view to securing the best results from the application of the appropriation made by the act of March 2, 1907. Bids will be called for early in the coming fiscal year for redredging the channel in the vicinity of the mouth of the Western Branch.

Money statement.

July 1, 1907, balance unexpended	$5,053.39
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	13.55
July 1, 1908, balance unexpended	5,039.84
Amount (estimated) required for completion of existing project	7,769.50
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	5,000.00

APPROPRIATIONS.

March 3, 1873	$15,000	July 13, 1892	$10,000
March 23, 1874	10,000	August 15, 1894	10,000
March 3, 1875	5,000	June 3, 1896	5,000
March 14, 1876	5,000	March 3, 1899	5,000
June 18, 1878	2,000	March 2, 1907	5,000
August 11, 1888	10,000		
September 19, 1890	10,000	Total	92,000

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COMMERCIAL STATISTICS.

The following statistics relative to the commerce of the Nansemond River, Virginia, during the calendar year 1907, were compiled from statements of parties making shipments by the river:

Articles.	Quantity.	Value.
	Tons.	
Brick	15,000	$30,000
Clay	25,800	8,950
Coal	5,000	15,000
Ice	600	1,500
Lime	500	2,500
Lumber	92,496	146,509
Oysters	1,200	60,000
Miscellaneous	15,604	4,096,200
Total	156,200	4,360,749

Approximate amount of freight handled by water during various years.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1888	109,900	1899	31,796
1890	217,338	1900	16,693
1891	78,572	1901	119,892
1892	133,723	1902	50,950
1893	89,472	1903	36,127
1894	53,762	1904	22,119
1895	59,701	1905	77,204
1896	61,405	1906	91,063
1897	43,500	1907	156,200

L 5.

IMPROVEMENT OF PAGAN RIVER, VIRGINIA.

There were no operations and no expenditures during the fiscal year. The project for this waterway is completed, but maintenance work will be required from time to time, as the channel is very narrow and liable to deterioration.

Money statement.

July 1, 1907, balance unexpended	$198.99
July 1, 1908, balance unexpended	198.99

APPROPRIATIONS.

June 14, 1880	$5,000
March 3, 1881	5,000
June 13, 1902	10,870
Total	20,870

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COMMERCIAL STATISTICS.

The following statistics represent the commerce of Pagan River, Virginia, during the calendar year 1907:

Articles.	Quantity.	Value.
	Tons.	
Coal	800	$2,500.00
Peanuts	53,000	2,719,901.25
Miscellaneous	35,489	10,537,700.00
Total	89,289	13,260,101.25

The Old Dominion Steamship Company operates two steamers on this river as far as Smithfield, Va., each making a round trip daily, except Sundays, from Norfolk, Va.

Approximate amount of freight handled by water during various years.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1901	108,058	1905	82,207
1902	75,614	1906	87,505
1903	120,121	1907	89,289
1904	85,078		

L 6.

IMPROVEMENT OF APPOMATTOX RIVER, VIRGINIA.

(A) MAINTENANCE.

The only operations during the fiscal year consisted in the resurvey of the navigable channel from the city of Petersburg down to Point of Rocks and the preparation of a contract for restoring the channel by dredging to project width and depth over about 5 miles of the distance below Petersburg. This improvement is intimately connected with the diversion work now under way at Petersburg, and the application of the appropriation made by the act of March 2, 1907, has been timed with reference to the progress of the latter work. The diversion work having reached a stage where the diversion channel is commencing to take the low-water discharge of the river, the work of cleaning out the navigable channel has been contracted for, and dredging will commence early in the coming fiscal year. The delay in completing the diversion scheme has seriously hampered the navigation of the river, and caused the postponement of remedial measures which would be ineffective until the diversion scheme is well advanced.

Money statement.

July 1, 1907, balance unexpended	$49,933.33
June 30, 1908, amount expended during fiscal year for works of improvement	741.10
July 1, 1908, balance unexpended	49,192.23
July 1, 1908, amount covered by uncompleted contracts	30,500.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

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(B) AT PETERSBURG.

This work is not directly a project for the improvement of an existing channel, but a project for diverting the course of the Appomattox River from its present channel into a former geological channel, this with a view of freeing the existing channel from receiving sediment brought down by freshets.

Work has continued throughout the fiscal year under contract. The following statement shows the quantity and cost of work done under the contract described hereinafter during the fiscal year ended June 30, 1908:

Locality.	Quantity done.	Quantity.	Unit price.	Cost of work during fiscal year 1908.
	Cu. yds.	*Tons.*		
Section A	36,746		$0.23	$8,084.12
Section B	7,141		.40	2,856.40
Section C	380		.18	68.40
Section D	6,780		.18	1,220.40
ROCK PLACED IN DAM.				
Large rock		2,090	1.70	3,553.00
Medium rock		1,268	1.70	2,155.60
Crushed stone		2,504	1.90	4,757.60
Concrete for railroad piers	579.85		10.00	5,798.50
Coping	84.51		20.00	1,690.20
Fill behind abutment	1,390		.40	556.00
Rock removed, excavating pier foundations	10.30		2.50	25.75
Flume				2,000.00
Extra pipe for flume, 53 feet 4 inches			7.50	400.00
Bents for pipe flume				150.00
Total				33,315.97

The project is about 80 per cent completed and funds are available for the remaining work, all of which is covered by a single contract.

The contractor is far behind his contract time of completion, which was set for October 3, 1906.

Recurring freshets, unforeseen difficulties incident to the character of the work, poor management, and insufficient capital have all contributed to delay the progress of the contractor.

Money statement.

July 1, 1907, balance unexpended	$97,957.92
June 30, 1908, amount expended during fiscal year for works of improvement	33,139.51
July 1, 1908, balance unexpended	64,818.41
July 1, 1908, outstanding liabilities	4,386.44
July 1, 1908, balance available	60,431.97
July 1, 1908, amount covered by uncompleted contracts	42,434.76

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APPROPRIATIONS.

March 3, 1871	$50,000.00	June 3, 1896	$5,000.00
June 10, 1872	40,000.00	March 3, 1899	5,000.00
March 3, 1873	30,000.00	June 13, 1902	32,500.00
June 23, 1874	30,000.00	March 3, 1903	175,000.00
March 3, 1875	30,000.00	March 3, 1905	10,000.00
August 14, 1876	30,000.00	March 2, 1907	50,000.00
June 18, 1878	30,000.00	"Emergencies in river and harbor works:"	
March 3, 1879	20,000.00		
June 14, 1880	20,000.00	June 6, 1900	5,000.00
March 3, 1881	20,000.00	April 28, 1904	12,000.00
August 2, 1882	35,000.00		
July 5, 1884	25,000.00	Total	723,330.00
August 5, 1886	18,750.00	Repaid to appropriation for "Emergencies in river and harbor works"	331.70
August 11, 1888	15,000.00		
September 19, 1890	15,000.00		
July 13, 1892	15,080.00		
August 18, 1894	5,000.00	Aggregate	722,998.30

CONTRACTS IN FORCE.

MAINTENANCE.

With the Atlantic Dredging Company, for dredging, dated April 8, 1908; approved June 22, 1908; date for commencing work August 1, 1908; date for completing work, July 1, 1909. Prices: For dredging, material rehandled and deposited in levees conforming to lines and grades, 41 cents per cubic yard, place measurement; material deposited in levees, conforming to lines and grades without rehandling, 31½ cents per cubic yard, place measurement; material deposited behind dikes and in sloughs without rehandling, 19½ cents per cubic yard, place measurement.

AT PETERSBURG.

With Atlantic Dredging Company, for dredging and building embankments, dam, highway bridge, railroad bridge, piers, and flume, dated July 14, 1904; approved July 30, 1904; work commenced October 3, 1904; date for expiration, October 3, 1906 (time limit waived). Prices: Section A, (*a*) 40 cents per cubic yard, measured in the cut; (*b*) 22 cents per cubic yard, measured in the cut; section B, 40 cents per cubic yard, measured in the cut; section C, (*a*) 50 cents per cubic yard, measured in the fill; (*b*) 18 cents per cubic yard, measured in the cut; section D, 18 cents per cubic yard, measured in the cut; rock for dam: $1.70 per gross ton for large, $1.70 per gross ton for medium, $1.90 per gross ton for crushed stone; railroad bridge, piers, and abutments, for concrete, $10 per cubic yard, measured in place; for coping, $20 per square yard of horizontal area; for fill behind abutments, 40 cents per cubic yard, measured in the fill; for highway bridge, $14,000; flume, $2,000; revetment, $1.50 per square yard.

COMMERCIAL STATISTICS.

Mr. William N. Hays, harbor master, Petersburg, Va., reports practically no change in commerce of Appomattox River, Virginia, as reported in calendar year 1906, in last annual report.

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Approximate amount of freight handled by water during previous years.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1888	30,626	1900	155,745
1889	26,121	1901	145,509
1890	21,693	1902	100,648
1891	26,275	1903	108,628
1892	25,218	1904	42,337
1895	81,318	1905	53,282
1897	84,031	1906	30,438
1898	95,941	1907	(a)
1899	(a)		

a Not obtained.

L 7.

IMPROVEMENT OF HARBOR AT CAPE CHARLES CITY, VIRGINIA.

During the fiscal year the harbor and approach channel were surveyed and a contract entered into for completing the dredging in the inner harbor and for redredging a portion of the approach channel in Cherrystone Inlet. During the fiscal year there were removed 59,566 cubic yards, scow measure, from the harbor and 548 cubic yards, scow measure, from the entrance channel at the contract price of 21½ cents per cubic yard. The dredging in the inner harbor is nearly completed and the entire project is about 50 per cent completed.

Money statement.

July 1, 1907, balance unexpended		$41,237.57
June 30, 1908, amount expended during fiscal year for works of improvement		10,836.46
July 1, 1908, balance unexpended		30,401.11
July 1, 1908, outstanding liabilities		2,991.27
July 1, 1908, balance available		27,409.84
July 1, 1908, amount covered by uncompleted contracts		17,947.59
Amount (estimated) required for completion of existing project		17,340.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$15,000.00	
For maintenance of improvement	10,000.00	
		25,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

September 19, 1890	$25,000	March 3, 1905	$25,000
July 13, 1892	10,000	March 2, 1907	25,000
March 3, 1899	20,000		
June 13, 1902	20,000	Total	125,000

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CONTRACT IN FORCE.

With L. M. Lewis, for dredging, dated February 17, 1908; approved March 7, 1908; date for commencing work May 11, 1908; date for completing work, January 11, 1909. Price: 21½ cents per cubic yard, scow measurement.

COMMERCIAL STATISTICS.

The following statement represents the commerce of the harbor at Cape Charles city, Va., during the calendar year 1907, and was prepared from statements supplied by lines and individuals handling the freight:

Articles.	Quantity.	Value.
	Tons.	
Merchandise and products	2,121,301	$53,032,525

Approximate amount of freight handled by water during the various years.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1890	390,207	1900	(a)
1891	319,164	1901	940,646
1892	341,269	1902	1,031,598
1893	393,352	1903	1,155,952
1894	427,723	1904	1,404,146
1895	455,269	1905	1,512,798
1896	487,004	1906	1,723,635
1898	569,894	1907	2,121,301
1899	591,298		

[a] No statement.

L 8.

IMPROVEMENT OF WATERWAY FROM NORFOLK, VIRGINIA, TO THE SOUNDS OF NORTH CAROLINA.

The expenditures during the fiscal year were made on account of rebuilding 40 linear feet of bank revetment in Turners Cut and in expenses of inspecting the waterway from time to time. With the exception of the approach to the Dismal Swamp Canal from the Norfolk end at Deep Creek, this waterway is in good condition. The channel in Deep Creek near the entrance to the lock is reported as having deteriorated, and it is proposed to examine the same early in the coming fiscal year and to apply the necessary remedies.

Money statement.

July 1, 1907, balance unexpended	$5,043.22
June 30, 1908, amount expended during fiscal year for works of improvement	222.82
July 1, 1908, balance unexpended	4,820.40
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	5,000.00

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APPROPRIATIONS.

March 3, 1899	$25,000	March 2, 1907	$5,000
June 6, 1900	200,000		
March 3, 1901	29,870	Total	262,870
March 3, 1905	3,000		

COMMERCIAL STATISTICS.

The following statistics were compiled from a statement furnished by the Lake Drummond Canal and Water Company, and indicate the traffic through the Dismal Swamp Canal, Virginia and North Carolina, during the calendar year 1907:

Articles.	Quantity.	Value.
	Tons.	
Lumber	212,939	$1,402,000
Miscellaneous	153,400	3,157,440
Total	366,339	4,559,440

Vessels.

Class.	Number.	Average draft.	Average tonnage.
		Feet.	*Tons.*
Steamers	482	8	122
Sail	1,137	7	35
Barges and lighters	1,240	8½	285

It has not been found practicable in previous years to get the commerce in tons; therefore, comparative statement is not appended.

L 9.

IMPROVEMENT OF INLAND ROUTE FROM NORFOLK HARBOR, VIRGINIA, TO ALBEMARLE SOUND, NORTH CAROLINA, THROUGH CURRITUCK SOUND.

The U. S. snag boat *Roanoke* was employed at various times during the fiscal year on different portions of this route, removing obstructions impeding and endangering navigation. The following is a statement of the obstructions removed from the different sections of the route: From the Southern Branch of the Elizabeth River, 18 logs, 1 rudder and 1 boiler-furnace; from North Landing River, 120 logs; from North River, 8 logs; and from Albemarle Sound, 2 logs.

The dredged channel through Currituck Sound is showing signs of deterioration between light beacons 6 and 8, due to barges and tugs getting out of the channel and pulling material into the dredged cut. Dredging will be necessary to restore the channel at a number of places.

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Money statement.

July 1, 1907, balance unexpended	$3,233.91
July 1, 1908, received from sales during fiscal year	26.75
	3,260.66
June 30, 1908, amount expended during fiscal year for maintenance of improvement	1,433.50
July 1, 1908, balance unexpended	1,827.16
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	10,000.00

APPROPRIATIONS.

For Southern Branch Elizabeth River, Virginia:		
March 3, 1873	$15,000.00	
June 23, 1874	10,000.00	
March 3, 1875	5,000.00	
August 14, 1876	5,000.00	
June 18, 1878	5,000.00	
		$40,000.00
For North Landing River, Virginia and North Carolina:		
March 3, 1879	25,000.00	
June 14, 1880	15,000.00	
March 3, 1881	7,500.00	
August 2, 1882	8,000.00	
		55,500.00
For Currituck Sound, Coinjock Bay, and North River Bar, North Carolina:		
June 18, 1878	20,000.00	
March 3, 1879	25,000.00	
June 14, 1880	25,000.00	
March 3, 1881	30,000.00	
August 2, 1882	20,000.00	
June 5, 1884	5,000.00	
August 5, 1886	10,000.00	
August 11, 1888	7,500.00	
		142,500.00
For inland water route, etc.:		
September 19, 1890	10,000.00	
July 13, 1892	9,000.00	
August 18, 1894	10,000.00	
June 3, 1896	10,000.00	
March 3, 1899	8,000.00	
June 13, 1902	23,400.00	
March 3, 1905	22,000.00	
March 2, 1907	3,000.00	
		95,400.00
Total		333,400.00
Amount received from sale of property		2,340.69
Aggregate		335,740.69

COMMERCIAL STATISTICS.

The following statistics relative to the commerce of the inland water route from Norfolk Harbor, Virginia, to Albemarle Sound, North Carolina, during the calendar year 1907 were compiled from statements furnished by the Albemarle and Chesapeake Canal Company:

Lumber, logs, shingles, merchandise, etc., 188,543 tons; value not known.

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Vessels.

Class.	Number.	Average draft.	Average tonnage.
		Feet.	*Tons.*
Steam	2,213	3 to 9	72
Sail	514	3 to 9	54
Barges	618	3 to 9	259
Rafts	299	.....	.....

Approximate amount of freight shipped and received by water during various years.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1900	195,958	1904	144,041
1901	210,264	1905	88,580
1902	199,062	1906	100,000
1903	203,812	1907	188,543

L 10.

IMPROVEMENT OF PERQUIMANS RIVER, NORTH CAROLINA.

No operations were carried on during the fiscal year and no expenditures were incurred.

The project is considered as having been completed, but work of maintenance will be required from time to time to keep the improvement available.

Money statement.

July 1, 1907, balance unexpended	$81.94
July 1, 1908, balance unexpended	81.94

APPROPRIATIONS.

August 14, 1876	$2,500
March 3, 1905	11,250
Total	13,750

COMMERCIAL STATISTICS.

The following statistics relative to the commerce of Perquimans River, North Carolina, during the calendar year 1907 were compiled from statements furnished by the shippers making shipments over this stream:

Article.	Quantity.	Value.
	Tons.	
Cotton	400	$80,000
Cotton seed	1,000	25,000
Fertilizer	1,500	38,000
Fish	450	50,000
Ice	200	1,000
Lumber	62,500	508,000
Peanuts	250	20,000
Truck and melons	1,300	97,000
Miscellaneous	2,000	100,000
Total	69,600	919,000

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Approximate amount of freight handled by water during various years.

Year.	Quantity.
	Tons.
1904	38,300
1905	50,375
1906	108,570
1907	69,600

L 11.

IMPROVEMENT OF BLACKWATER RIVER, VIRGINIA.

The U. S. snag boat *Roanoke* was employed on this improvement from September 20 to October 16, 1907, and from February 1, 1908, to March 10, 1908. During these periods the snag boat removed 668 logs, 13 trees, 14 snags, 1 stump, and 1 pile from the channel.

The entire distance of the river covered by the project has been cleared of obstructions, but it will be necessary from time to time to remove logs which become detached from rafts and sink in the channel, and the available balance should be retained for that purpose.

Money statement.

July 1, 1907, balance unexpended	$8,000.00
June 30, 1908, amount expended during fiscal year for works of improvement	2,144.33
July 1, 1908, balance unexpended	5,855.67

APPROPRIATIONS.

June 18, 1878	$5,000	August 2, 1882	$1,500
March 3, 1879	2,500	March 2, 1907	8,000
June 14, 1880	3,500		
March 3, 1881	1,500	Total	22,000

COMMERCIAL STATISTICS.

The following statistics relative to the commerce of Blackwater River, Virginia, during the calendar year 1907 were compiled from statements furnished by the shippers making shipments over this stream:

Articles.	Quantity.	Value.
	Tons.	
Miscellaneous	5,300	$346,400

Approximate amount of freight handled by water during the various years.

Year.	Quantity.
	Tons.
1906	5,200
1907	5,300

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L 12.

IMPROVEMENT OF MEHERRIN RIVER, NORTH CAROLINA.

The U. S. snag boat *Roanoke* was employed on this improvement from August 20, 1907, to September 12, 1907, and from January 2 to 31, 1908. During these periods the snag boat removed 271 logs, 8 snags, 3 trees, 4 piles, and 1 flatboat from the channel.

The entire distance of the river covered by the project has been cleared of obstructions, but it will be necessary from time to time to remove logs which become detached from rafts and sink in the channel, and the available balance should be retained for that purpose.

Money statement.

July 1, 1907, balance unexpended	$6,000.00
June 30, 1908, amount expended during fiscal year for works of improvement	1,932.88
July 1, 1908, balance unexpended	4,067.12

APPROPRIATIONS.

August 2, 1882	[a] $5,000
March 2, 1907	6,000
Total	11,000

COMMERCIAL STATISTICS.

The following statistics relative to the commerce of Meherrin River, North Carolina, during the calendar year 1907 were compiled from statements furnished by the shippers making shipments over this stream:

Articles.	Quantity.	Value.
	Tons.	
Logs	800	$5,600
Lumber	500	4,000
Miscellaneous	8,021	1,043,730
Total	9,321	1,053,330

Approximate amount of freight handled by water during the various years.

Year.	Quantity.
	Tons.
1906	8,900
1907	9,321

[a] Of this amount $415.47 was carried to the surplus fund.

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L 13.

IMPROVEMENT OF ROANOKE RIVER, NORTH CAROLINA.

During the fiscal year the U. S. snag boat *Roanoke* was engaged from November 6 to December 12, 1907, in clearing the stream of obstructions. Operations were carried on between Williamston and the State Farm. A total of 22 trees and 4 snags were removed from the channel, and 19 trees overhanging the channel were cut down and the pieces placed on the banks.

All work done during the year was for the purpose of maintaining the channel. The adopted project is about 80 per cent completed, but it is not thought that the present commerce of the river calls for more than the maintenance of the existing channel by the removal of obstructions as they may occur from time to time.

Money statement.

July 1, 1907, balance unexpended	$5,667.31
June 30, 1908, amount expended during fiscal year for maintenance of improvement	1,704.83
July 1, 1908, balance unexpended	3,962.48
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	5,000.00

APPROPRIATIONS.

March 3, 1871	$20,000.00	September 19, 1890	$25,000.00
June 10, 1872	10,000.00	July 13, 1892	50,000.00
March 3, 1873	10,000.00	August 18, 1894	30,000.00
June 23, 1874	5,000.00	June 3, 1896	10,000.00
August 2, 1882	5,000.00	March 3, 1905	10,000.00
July 5, 1884	3,000.00	March 2, 1907	3,000.00
August 5, 1886	20,000.00		
August 11, 1888	40,000.00	Total	241,000.00
Amount received from sales of property			1,351.75
Aggregate			242,351.75

COMMERCIAL STATISTICS.

The following statistics show the commerce of Roanoke River, North Carolina, during the calendar year 1907, and were compiled from statements obtained from the shippers:

Articles.	Quantity.	Value.
	Tons.	
Logs	11,250	$63,000
Lumber	32,500	304,000
Shingles	500	6,000
Miscellaneous	16,858	3,371,600
Total	61,108	3,744,600

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Approximate amount of freight handled by water during the various years.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1870	150,000	1903	115,875
1890	152,000	1904	32,790
1891	376,181	1905	(a)
1900	27,432	1906	88,508
1901	226,736	1907	61,108
1902	163,564		

a Not complete.

L 14.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

Wreck of barge (name unknown).—This barge sank in Smith Creek, an arm of Norfolk Harbor. Its removal was authorized June 10, 1907, at a cost not to exceed $300.

The U. S. snag boat *Roanoke* moved the wreck on the flats, and it was there cut up and the pieces placed ashore. The total cost of the work was $300.

Wreck of schooner Edith Fowle.—This schooner sank in Norfolk Harbor near the entrance to Smith Creek. Its removal was authorized August 14, 1907, at a cost not to exceed $300.

Proposals were invited for destroying the wreck, and the work was awarded to the Coastwise Dredging Company, the lowest bidder.

The contractor destroyed the wreck by the use of explosives in August, 1907. The total cost of the work was $300.

Wreck of schooner Dauntless.—This schooner sank in mid-channel, Norfolk Harbor, Virginia. Its removal was authorized September 26, 1907, at a cost not to exceed $1,000.

Proposals were invited for destroying the wreck, and the work was awarded to the Coastwise Dredging Company, the lowest bidder.

The contractor destroyed the wreck by the use of explosives in October, 1907. The total cost of the work was $710.50.

Wreck of steamer Emma K.—This steamer sank in Chesapeake Bay, Virginia, about 1 mile southeast of Back River light-house. Its removal was authorized December 21, 1907, at a cost not to exceed $500.

Proposals were invited for destroying the wreck, and the work was awarded to L. M. Lewis, the lowest bidder.

The contractor raised the wreck during December, 1907, and towed it to Norfolk and had it hauled out on a marine railway and repaired. The total cost of the work was $500.

Wreck of steamer Tourist.—This steamer sank in Albemarle Sound, North Carolina. Its removal was authorized December 27, 1907, at a cost not to exceed $4,000.

Proposals were invited for destroying the wreck and the work was awarded to the Coastwise Dredging Company, the lowest bidder.

The contractor destroyed the wreck by the use of explosives in February, 1908. The total cost of the work was $1,100.

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Wreck of schooner Kate Johnson.—This schooner sank in Cypress Creek, Virginia. Its removal was authorized December 28, 1907, at a cost not to exceed $150.

A written agreement was entered into with Mr. W. L. Marshall for the removal of the wreck.

The wreck was removed from the navigable channel and placed in shallow water in January, 1908, under said agreement. The total cost of the work was $150.

Wreck of schooner Custis W. Wright and schooner (name not known).—These schooners sank in James River, Virginia, near Newport News, Va. Their removal was authorized April 25, 1908, at a cost not to exceed $1,500.

Proposals were invited for destroying the wrecks and the work was awarded to the Coastwise Dredging Company, the lowest bidder.

The contractor destroyed the wrecks by the use of explosives in May, 1908. The total cost of the work was $1,154.67.

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APPENDIX M.

IMPROVEMENT OF CERTAIN RIVERS AND HARBORS IN THE WILMINGTON, NORTH CAROLINA, DISTRICT.

REPORT OF CAPT. EARL I. BROWN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Scuppernong River, North Carolina.
2. Fishing Creek, North Carolina.
3. Pamlico and Tar rivers, North Carolina.
4. Contentnia Creek, North Carolina.
5. Neuse and Trent rivers, North Carolina.
6. Inland waterway from Pamlico Sound to Beaufort Inlet, North Carolina.
7. Inland waterway between Newbern and Beaufort, North Carolina.
8. Harbor at Beaufort, North Carolina.
9. Beaufort Inlet, North Carolina.
10. New River, including inland waterways between Beaufort Harbor and New River and between New River and Swansboro, North Carolina.
11. Northeast (Cape Fear) and Black rivers, and Cape Fear River above Wilmington, North Carolina.
12. Cape Fear River North Carolina, at and below Wilmington.
13. Shallotte River, North Carolina.

UNITED STATES ENGINEER OFFICE,
Wilmington, N. C., July 18, 1908.

SIR: In compliance with General Orders, No. 4, April 15, 1908, I have the honor to forward the annual reports for the Wilmington, N. C., district for the fiscal year 1908.

Very respectfully, your obedient servant,

EARL I. BROWN,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

M 1.

IMPROVEMENT OF SCUPPERNONG RIVER, NORTH CAROLINA

Reference.—See page 280 of current summary.

There was no work done during the year, the money expended being for part purchase of plant to be used on this and neighboring work.

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Money statement.

July 1, 1907, balance unexpended	$2,030.03
June 30, 1908, amount expended during fiscal year for maintenance of improvement	500.00
July 1, 1908, balance unexpended	1,530.03
July 1, 1908, outstanding liabilities	12.60
July 1, 1908, balance available	1,517.43
Amount (estimated) required for completion of existing project	2,500.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$2,500.00
For maintenance of improvement	2,500.00
	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Prior to 1887	$8,000
June 13, 1902	10,000
March 3, 1905	5,000
March 2, 1907	2,000
Total	25,000

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	20	$3	$60
Coal	650	5	3,250
Cotton	1,000	210	210,000
Cotton seed	300	20	6,000
Cotton-seed meal	100	25	2,500
Eggs	53	300	15,900
Fertilizers	2,200	22	48,400
Fish	80	60	4,800
General merchandise	5,000	140	700,000
Grain	360	35	12,600
Hay	350	20	7,000
Hogs	290	100	29,000
Horses	100	100	10,000
Lumber	40,680	10	406,800
Machinery	50	100	5,000
Poultry	30	200	6,000
Peanuts	20	60	1,200
Potatoes	4,545	20	90,900
Shingles	40	8	320
Timber	12,412	7	86,884
Vegetables	100	20	2,000
Wood	50	4	200
Cattle	200	60	12,000
Total	68,630	.....	1,660,814

Transportation lines established during the year, none.
Number of passengers transported, 5,300.

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Statement of vessels navigating Scuppernong River, North Carolina, during the calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Schooners	26	1,050	4 to 9
Barges	7	1,400	4 to 8
Steamers	10	698	4 to 8

M 2.

IMPROVEMENT OF FISHING CREEK, NORTH CAROLINA.

Reference.—See page 282 of current summary.

No active operations were carried on during the year. The expenditures were for maintenance.

Money statement.

July 1, 1907, balance unexpended	$356.20
June 30, 1908, amount expended during fiscal year for maintenance of improvement	9.08
July 1, 1908, balance unexpended	347.12
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	1,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1889.

APPROPRIATIONS.

September 19, 1890	$10,000	March 3, 1905	$500
July 13, 1892	5,000		
March 3, 1899	7,750	Total	25,250
June 13, 1902	2,000		

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Cotton seed	236	$20	$4,720
Cotton-seed meal	204	25	5,100
Fertilizers	356	22	7,832
General merchandise	20	140	2,800
Timber	675	7	4,725
Total	1,491	.....	25,177

No passengers handled.

No transportation lines established during the year.

Statement of vessels navigating Fishing Creek, North Carolina, for calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Steamers	1	57	3
Launches	2	25	2 to 3

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M 3.

IMPROVEMENT OF PAMLICO AND TAR RIVERS, NORTH CAROLINA.

[One river, called Pamlico below and Tar above Washington, N. C.]

Reference.—See page 283 of current summary.

The U. S. dredge *Scuppernong*, operated by hired labor, continued work on Fort Point shoal, below Washington, until August 10, 1907, when it was finished to a width of 100 feet and a mean low-water depth of 9 feet, completing the project below Washington. The dredge removed from a cut 1,862 feet long, 100 feet wide, and 9 feet deep, at mean low water, 39,300 cubic yards of material, 12 logs, and 125 stumps.

After completing the project below Washington, the dredge began work on the modified project for a mean low-water depth of 4 feet between Washington and Greenville, completing this project September 30. The dredge removed from nine shoals, total length 2,450 feet, 18,719 cubic yards of material and 47 logs. The cuts were dredged 60 feet wide and 4 to 5 feet deep at mean low water.

The expenditures for the year were $6,899.12. Deducting $2,333.07 outstanding June 30, 1907, and adding $14.33 outstanding June 30, 1908, the cost of the year's work is found to be $4,580.38. All of this is for improvement, $2,981.95 being for work below Washington and $1,598.43 for work between Washington and Greenville. This sum is made up as follows:

Operating plant	$3,465.78
Repairing scows and caring for plant	102.52
Local superintendence	460.55
Main office expenses	551.53
Total	4,580.38

making the cost of the dredging below Washington 7.6− cents per cubic yard, and between Washington and Greenville 8.5+ cents per cubic yard, allowing nothing for logs and stumps.

Money statement.

July 1, 1907, balance unexpended	$8,441.42
June 30, 1908, refundments during fiscal year	.10
	8,441.52
June 30, 1908, amount expended during fiscal year for works of improvement	6,899.12
July 1, 1908, balance unexpended	1,542.40
July 1, 1908, outstanding liabilities	14.33
July 1, 1908, balance available	1,528.07
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

Date.	Amount.	Aggregate.	Date.	Amount.	Aggregate.
July 4, 1836, to July 7, 1838.	$10,000.00	$10,000.00	September 19, 1890	$10,000.00	$75,000.00
			July 13, 1892	10,000.00	85,000.00
August 14, 1876	15,000.00	15,000.00	August 18, 1894	10,000.00	95,000.00
May 3, 1879	6,000.00	21,000.00	June 3, 1896	5,000.00	103,000.00
June 14, 1880	9,000.00	30,000.00	March 3, 1899	15,000.00	118,000.00
March 3, 1881	8,000.00	38,000.00	June 13, 1902	35,500.00	153,500.00
August 2, 1882	10,000.00	48,000.00	March 3, 1905	8,000.00	161,500.00
July 5, 1884	5,000.00	53,000.00	March 2, 1907	11,563.00	173,063.00
August 5, 1886	5,000.00	58,000.00	Sales, refundments, etc	172.75	173,235.75
August 11, 1888	10,000.00	68,000.00			

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

Class of goods	Tons.	Price.	Value.
Brick	692	$3	$2,076
Coal	10,403	5	52,015
Cotton	7,187	210	1,509,270
Cotton seed	7,710	20	154,200
Cotton-seed oil	1,125	140	157,500
Cotton-seed meal	4,151	25	103,775
Clams	4,700	50	235,000
Eggs	128	300	38,400
Fertilizers	19,546	22	430,012
Fish	2,049	60	122,940
General merchandise	94,487	140	13,228,180
Grain	6,487	35	227,045
Hay	8,500	20	170,000
Hogs	133	100	13,300
Horses	80	100	8,000
Lumber	130,324	10	1,303,240
Machinery	1,998	100	199,800
Oysters	2,158	35	75,530
Poultry	18	200	3,600
Peanuts	23	60	1,380
Potatoes	4,547	20	90,940
Rosin	500	25	12,500
Shingles	1,696	8	13,568
Tobacco, leaf	980	200	196,000
Turpentine:			
Crude	40	28	1,120
Spirits	190	145	27,550
Tar	32	15	480
Timber	106,017	7	742,119
Vegetables	2,639	20	52,780
Wood	8,185	4	32,740
Cattle	5	60	300
Cotton-seed hulls	513	18	9,234
Oyster shells	1,135	3	3,405
Total	428,378	.....	19,217,999

Transportation lines established during the year, none.
Number of passengers handled, 10,023.

Statement of vessels navigating Pamlico and Tar rivers, North Carolina, during the calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Steamers	15	480	3 to 8
Schooners	95	1,330	2 to 8
Launches	20	100	2 to 4
Barges	30	6,000	5 to 8

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M 4.

IMPROVEMENT OF CONTENTNIA CREEK, NORTH CAROLINA.

Reference.—See page 284 of current summary.

There was no work done during the year. The money expended was for part purchase of plant for use in this and neighboring streams.

Additional appropriations of $3,000 annually are recommended for maintenance.

Money statement.

July 1, 1907, balance unexpended	$1,944.84
June 30, 1908, amount expended during fiscal year for maintenance of improvement	231.38
July 1, 1908, balance unexpended	1,713.46
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	3,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Date.	Amount.	Aggregate.	Date.	Amount.	Aggregate.
March 3, 1881	$10,000	$10,000	Allotted January 27, 1905, from emergency appropriation, act of April 28, 1904	$500	$72,000
August 2, 1882	10,000	20,000			
July 5, 1884	5,000	25,000			
August 5, 1886	15,000	40,000			
August 11, 1888	5,000	45,000	March 3, 1905	1,000	73,000
September 19, 1890	7,000	52,000	March 2, 1907	2,000	75,000
July 13, 1892	7,000	59,000	Sales	177	75,177
August 18, 1894	10,000	69,000			
March 3, 1899	2,000	71,000			
Allotted from emergency appropriation, act of June 13, 1902	500	71,500			

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Unit price.	Value.
Cotton	200	$210	$42,000
Cotton seed	1,500	20	30,000
Cotton-seed meal	1,950	25	48,750
Fertilizers	7,995	22	175,890
General merchandise	350	140	49,000
Grain	500	35	17,500
Hay	125	20	2,500
Timber	11,250	7	78,750
Total	23,870	.....	444,390

Transportation lines established during the year, none.

No passengers transported.

Statement of vessels navigating Contentnia Creek, North Carolina, during the calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
Steamers	5	210	*Feet.* 2 to 5

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M 5.

IMPROVEMENT OF NEUSE AND TRENT RIVERS, NORTH CAROLINA.

(A) NEUSE RIVER.

Reference.—See current summary, page 285.

The work for the year consisted of snagging, using Government plant and hired labor. Work was carried on between Newbern and Seven Springs, near Whitehall, whenever the stage of water permitted. There were removed from the channel 266 large snags, 81 stumps, 508 logs, 370 trees, 8¼ cords of small snags, and 1 pile, and from the banks 8 cords of brush were cut and 115 trees hauled back.

Near the sixty-fourth milepost a cut-through between two bends of the river was cleaned out, and is now used by boats passing this point. About 2 miles in distance is saved.

The cost of the year's work was $7,426.23, all for maintenance. Of this amount, $1,000 was for the purchase of plant for use on this and other streams and $1,260.31 for repairing plant preliminary to resuming operations.

Money statement.

July 1, 1907, balance unexpended		$18,192.90
June 30, 1908, amount of sales, rents, etc., received during fiscal year		144.90
		18,337.80
June 30, 1908, amount expended during fiscal year for maintenance of improvement		6,619.32
July 1, 1908, balance unexpended		11,718.48
July 1, 1908, outstanding liabilities		806.91
July 1, 1908, balance available		10,911.57
Amount (estimated) required for completion of existing project		72,500.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$20,000.00	
For maintenance of improvement	10,000.00	
		30,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Date.	Amount.	Aggregate.	Date.	Amount.	Aggregate.
June 18, 1878	$40,000.00	$40,000.00	June 13, 1902	[a]$13,500.00	$320,000.00
March 3, 1879	45,000.00	85,000.00	Allotted from appropriation for emergencies in river and harbor works, act June 13, 1902	2,000.00	322,000.00
June 14, 1880	45,000.00	130,000.00			
March 3, 1881	30,000.00	160,000.00			
August 2, 1882	30,000.00	190,000.00			
July 5, 1884	20,000.00	210,000.00	Allotted from appropriation for emergencies in river and harbor works, act April 28, 1904	500.00	322,500.00
August 5, 1886	22,500.00	232,500.00			
August 11, 1888	15,000.00	247,500.00			
September 30, 1890	20,000.00	267,500.00			
July 13, 1892	15,000.00	282,500.00	March 3, 1905	[a]17,000.00	339,500.00
August 18, 1894	7,000.00	289,500.00	March 2, 1907	[a]18,000.00	357,500.00
June 3, 1896	7,000.00	296,500.00	Sales	364.00	357,864.00
March 3, 1899	10,000.00	306,500.00			

[a] Allotted from combined appropriations for Neuse and Trent rivers, North Carolina.

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COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	3,586	$3	$10,758
Coal and minerals	8,134	5	40,670
Cotton	7,452	210	1,564,920
Cotton seed	4,165	20	83,300
Cotton-seed oil	705	140	98,700
Cotton-seed meal	3,815	25	95,375
Clams	4,743	60	284,580
Eggs	106	300	31,800
Fertilizers	46,635	22	1,025,970
Fish	1,021	60	61,260
General merchandise	59,885	140	8,383,900
Grain	17,066	35	597,310
Hay	6,870	20	137,400
Hogs	110	100	11,000
Horses	30	100	3,000
Lumber	173,592	10	1,735,920
Machinery	1,065	100	106,500
Oysters	698	35	24,430
Poultry	47	200	9,400
Potatoes	2,144	20	42,880
Rosin	971	25	24,275
Shingles	1,704	8	13,632
Tobacco, leaf	980	200	196,000
Turpentine:			
Crude	111	28	3,108
Spirits	247	145	35,815
Tar	15	12	180
Timber	96,287	7	674,009
Vegetables	2,460	20	49,200
Wood	4,050	4	16,200
Cattle	25	60	1,500
Total	448,719	.....	15,382,992

Transportation lines established during the year, none.
Number of passengers handled, 17,078.

Statement of vessels navigating Neuse River, North Carolina, for calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Steamers	25	1,625	2 to 8
Barges	39	7,800	6 to 8
Launches	30	200	2 to 4
Schooners, sloops, etc	125	3,250	2 to 8

(B) TRENT RIVER.

Reference.—See page 287 of current summary.

The work consisted of maintenance between Newbern and Trenton by snagging and by redredging shoals below Trenton. There were removed from the channel between the thirty-seventh milepost and Trenton 1,343 cubic yards of sand, 38 large snags, 3 stumps, 32 logs, one-half cord of brush, and 5 trees, and from the banks 22 trees and 6½ cords of brush. It is reported that the dredged shoals have again filled in from recent freshets.

This work was done by Government plant and hired labor.

The cost of the work done during the year was $3,455.34, all for maintenance. There is included in the above $1,000 for purchase of plant for use on this and other streams.

The project is completed except that portion covered by Public Resolution No. 22, approved March 4, 1907, authorizing a channel 6 feet deep over Foy's flats at dead low water. A survey having this work in view has been made and the work is awaiting its turn for being carried out.

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Money statement.

July 1, 1907, balance unexpended	$12,115.85
June 30, 1908, amount received in refundment during fiscal year	13.10
	12,128.95
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,520.34
July 1, 1908, balance unexpended	8,608.61
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Date.	Amount.	Aggregate.	Date.	Amount.	Aggregate.
March 3, 1879	$7,000.00	$7,000.00	June 3, 1896	$2,000.00	$66,500.00
June 14, 1880	10,000.00	17,000.00	March 3, 1899	2,500.00	69,000.00
March 3, 1881	5,000.00	22,000.00	June 13, 1902	[a] 6,500.00	75,500.00
August 2, 1882	10,000.00	32,000.00	Allotted from appropriation for emergencies in river and harbor works, act June 13, 1902	1,000.00	76,500.00
July 5, 1884	10,000.00	42,000.00	March 3, 1905	[a] 23,000.00	99,500.00
August 5, 1886	3,500.00	45,500.00	March 2, 1907	[a] 12,000.00	111,500.00
August 11, 1888	5,000.00	50,500.00	Sales, etc	362.00	111,862.00
September 19, 1890	5,000.00	55,500.00			
July 13, 1892	5,000.00	60,500.00			
August 18, 1894	4,000.00	64,500.00			

[a] Allotted from combined appropriation for Neuse and Trent rivers, North Carolina.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	626	$3	$1,878
Coal	6,759	5	33,795
Cotton	2,057	210	431,970
Cotton-seed	2,905	20	58,100
Cotton-seed oil	175	140	24,500
Cotton-seed meal	1,915	25	47,875
Clams	4,744	50	237,200
Eggs	46	300	13,800
Fertilizers	11,316	22	248,952
Fish	1,505	60	90,300
General merchandise	60,496	140	8,469,440
Grain	17,176	35	601,160
Hay	6,840	20	136,800
Hogs	110	100	11,000
Horses	30	100	3,000
Lumber	67,916	10	679,160
Machinery	930	100	93,000
Oysters	703	35	24,605
Poultry	10	200	2,000
Peanuts	2	60	120
Potatoes	2,157	20	43,140
Rice, rough	1	50	50
Rosin	614	25	15,350
Shingles	652	8	5,216
Tobacco, leaf	980	200	196,000
Turpentine:			
Crude	101	30	3,030
Spirits	248	140	34,720
Tar	14	12	168
Timber	70,687	7	494,809
Vegetables	2,202	20	44,040
Wood	4,460	4	17,840
Cattle	41	60	2,460
Total	268,417	.....	12,065,478

Number of passengers transported, 13,932.
No transportation lines established during the year.

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Statement of vessels navigating Trent River, North Carolina, during the calendar year 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Steamers	25	1,625	2 to 8
Barges	15	3,000	6 to 8
Launches	30	180	2 to 4
Schooners, sloops, etc	115	2,990	2 to 8

M 6.

INLAND WATERWAY FROM PAMLICO SOUND TO BEAUFORT INLET, NORTH CAROLINA.

Reference.—See page 289 of current summary.

The work of the year consisted in completing a survey to definitely locate the route of the proposed canal. All field work and plotting was completed, route selected, surveys made of tracts of land required for right of way, titles to same examined, and abstracts of title prepared. The district attorney is now engaged in investigating these titles and conducting the necessary condemnation proceedings. Specifications for the construction of the waterway have been prepared and the work was advertised on June 25, proposals to be opened on July 27, 1908.

The cost of the year's work was $10,067.27. Of this amount $2,800 was for the purchase of plant for use on this and neighboring improvements.

Money statement.

July 1, 1907, balance unexpended	$199,075.09
Amount refunded during fiscal year	.08
Amount appropriated by sundry civil act approved May 27, 1908	170,000.00
	369,075.17
June 30, 1908, amount expended during fiscal year for works of improvement	10,821.99
July 1, 1908, balance unexpended	358,253.18
July 1, 1908, outstanding liabilities	93.68
July 1, 1908, balance available	358,159.50
Amount (estimated) required for completion of existing project	180,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	180,000.00

APPROPRIATIONS.

March 2, 1907	$200,000.00
May 27, 1907	170,000.00
Amount refunded during fiscal year	.08
Aggregate	370,000.08

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M 7.

IMPROVEMENT OF WATERWAY BETWEEN NEWBERN AND BEAUFORT, NORTH CAROLINA.

Reference.—See page 290 of current summary.

Operations during the year consisted of snagging and cleaning obstructions from the channels of Clubfoot and Harlowe creeks. This was completed on January 10, 1908. There were removed by Government plant and hired labor the following: One-fourth cord of small snags, 19 large snags, 2 stumps, 93 logs, 6 trees, and one-half cord of brush, at a total cost of $809.21. In addition to this, $500 was spent for the part purchase of plant for use on this and neighboring improvements, making the total expenditures $1,309.21.

The canal connecting the head of Clubfoot Creek (which empties into the Neuse) with the head of Harlowe Creek (which empties into the Newport River) is owned by a corporation, which does very little, if anything, in the way of maintenance. The United States makes no expenditures on this canal and makes no effort to keep the rest of the waterway in better condition than the canal itself.

Money statement.

July 1, 1907, balance unexpended	$2,031.60
June 30, 1908, amount expended during fiscal year for maintenance of improvement	1,309.21
July 1, 1908, balance unexpended	722.39
Amount (estimated) required for completion of existing project	55,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	1,000.00

Submitted in compliance with the requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Date.	Amount.	Aggregate.
August 2, 1882	$10,000	$10,000
August 5, 1886	10,000	20,000
August 11, 1888	15,000	35,000
March 2, 1907	2,000	37,000

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	16	$3	$48
Coal	70	5	350
Cotton	428	210	89,880
Cotton seed	730	20	14,600
Cotton-seed meal	160	25	4,000
Clams	300	50	15,000
Eggs	3	300	900
Fertilizers	3,150	22	69,300
Fish	250	60	15,000
General merchandise	9,500	140	1,330,000
Grain	292	35	10,220

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COMMERCIAL STATISTICS FOR THE YEAR ENDING DECMBER 31, 1907—Continued.

Class of goods.	Tons.	Price.	Value.
Hay	220	$20	$4,400
Hogs	2	100	200
Lumber	2,520	10	25,200
Machinery	20	100	2,000
Oysters	3,000	35	105,000
Poultry	2	200	400
Potatoes	125	20	2,500
Rosin	457	25	11,425
Shingles	68	8	544
Turpentine:			
Crude	71	28	1,988
Spirits	57	145	8,265
Tar	29	15	435
Timber	2,500	7	17,500
Vegetables	50	20	1,000
Wood	4,500	4	18,000
Cattle	10	60	600
Total	28,530	.....	1,748,755

Transportation lines established during the year, none.
No passengers transported.

Statement of vessels navigating waterway between Newbern and Beaufort, N. C., during the calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Launches	15	75	2 to 4
Barges	5	1,000	6 to 8
Steamers	5	165	4 to 6
Schooners, sloops, etc	80	1,760	2 to 4

M 8.

IMPROVEMENT OF HARBOR AT BEAUFORT, NORTH CAROLINA.

Reference.—See page 291 of current summary.

The Government snag boat *Trent*, with hired labor, continued the work of removing the remains of the old western spur jetty at Fort Macon Point and building other spur jetties in that vicinity with the stone so removed until October 20, when the work was completed. During this time there were removed from the old jetty 1,890.11 tons of stone, and 1,970.11 tons of stone were used in completing the two jetties in course of construction at the beginning of the year and in building two other jetties. Fifty cords of brush were cut and bundled and 71 cords used in the foundation. Eighty tons of this stone and 21 cords of the brush were on hand at the beginning of the year. The present lengths of those jetties are 85, 40, 212, and 128 feet.

At Fort Macon Point 1,088 linear feet of sand-bag groynes were built and 842 linear feet repaired. Some repairs were also made to old sand fences. Grass was planted on Bulkhead shoals at a cost of $93.67.

A survey of the whole harbor has just been completed, and is now being platted. This survey shows considerable shoaling in the channels in front of Beaufort and at Bulkhead shoals.

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The rock jetties completed during the year at Fort Macon Point have had a beneficial effect, but it may be necessary to extend those built and build others later. Considerable erosion has taken place at Shackleford Point during the year and later it may be advisable to repair the old jetties and build others.

The cost of the year's work was $6,942.53, all for maintenance.

It is proposed to spend the available balance and the additional appropriation recommended in redredging channels in front of Beaufort and across Bulkhead shoal maintaining sand fences at Fort Macon and Shackleford Points, and possibly in repairing and building rock jetties at Fort Macon and Shackleford Points.

Money statement.

July 1, 1907, balance unexpended	$21,256.81
June 30, 1908, amount expended during fiscal year for maintenance of improvement	7,199.34
July 1, 1908, balance unexpended	14,057.47
July 1, 1908, outstanding liabilities	1,007.38
July 1, 1908, balance available	13,050.09
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Date.	Amount.	Aggregate.	Date.	Amount.	Aggregate.
July 4, 1836	$5,000	$5,000	June 3, 1896	$5,000	$155,000
			June 13, 1902	3,000	158,000
March 5, 1880	30,000	30,000	Allotted from appropriation for emergencies in river and harbor works, act April 28, 1904	1,000	159,000
August 2, 1882	25,000	55,000			
July 5, 1884	20,000	75,000			
August 5, 1886	15,000	90,000			
August 11, 1888	35,000	125,000	March 3, 1905	2,000	161,000
September 19, 1890	15,000	140,000	March 2, 1907	22,000	183,000
July 13, 1892	10,000	150,000	Sales	350	183,350

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	230	$3.00	$690.00
Coal	595	5.00	2,975.00
Cotton	424	210.00	89,040.00
Cotton seed	612	20.00	12,240.00
Cotton-seed oil	12	140.00	1,680.00
Cotton-seed meal	142	25.00	3,550.00
Clams	5,583	60.00	334,980.00
Eggs	5	300.00	1,500.00
Fertilizers	2,815	22.00	61,930.00
Fish	6,590	60.00	395,400.00
General merchandise	8,155	140.00	1,141,700.00
Grain	353	35.00	12,355.00
Hay	335	20.00	6,700.00
Hogs	5	100.00	500.00
Horses	10	100.00	1,000.00

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COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907—Con.

Class of goods.	Tons.	Price.	Value.
Lumber	10,640	$10.00	$106,400.00
Machinery	25	100.00	2,500.00
Oysters	4,704	35.00	164,640.00
Poultry	2	200.00	400.00
Potatoes	174	20.00	3,480.00
Rosin	457	25.00	11,425.00
Shingles	88	8.00	724.00
Turpentine:			
Crude	70	28.00	1,960.00
Spirits	114	145.00	16,530.00
Vegetables	225	20.00	4,500.00
Wood	2,225	4.00	8,900.00
Cattle	10	60.00	600.00
Oyster shells	625	1.50	937.50
Soft crabs	36	120.00	4,320.00
Cross ties	4,000	7.00	28,000.00
Total	49,261	.....	2,421,556.50

No transportation lines established during the year.
Number of passengers transported, 5,000.

Statement of vessels navigating Beaufort Harbor, North Carolina, for calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Steamers	50	2,000	3 to 10
Schooners, sloops, etc	290	9,570	2 to 10
Launches and yachts	250	2,500	2 to 8

M 9.

IMPROVEMENT OF BEAUFORT INLET, NORTH CAROLINA.

Reference.—See page 293 of current summary.

There was no work done during the fiscal year 1908, the money expended being for pro rata share of purchase of plant and for office supplies.

Money statement.

July 1, 1907, balance unexpended	$5,515.76
June 30, 1908, amount expended during fiscal year for maintenance of improvement	312.69
July 1, 1908, balance unexpended	5,203.07
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	15,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

Date.	Amount.	Aggregate.
March 2, 1905	$45,000	$45,000
March 2, 1907	5,000	50,000

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Fish	4,317	$60	$259,020
General merchandise	500	140	70,000
Lumber	7,052	10	70,520
Cross-ties	4,000	7	28,000
Total	15,869	.....	427,540

No transportation lines established during the year.
No passengers handled.

Statement of vessels navigating Beaufort Inlet, North Carolina, for calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Steamers	50	1,850	3 to 12
Schooners, sloops, etc.	85	1,530	2 to 12
Launches and yachts	220	1,320	2 to 10

M 10.

NEW RIVER, INCLUDING INLAND WATERWAYS BETWEEN BEAUFORT HARBOR AND NEW RIVER AND BETWEEN NEW RIVER AND SWANSBORO, NORTH CAROLINA.

(A) NEW RIVER.

Reference.—See page 294 of current summary.

There was no work done during the year. The expenditures were for office expenses.

Money statement.

July 1, 1907, balance unexpended	$1,998.05
June 30, 1908, amount expended during fiscal year for maintenance of improvement	34.50
July 1, 1908, balance unexpended	1,963.55
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	2,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

Date.	Amount.	Aggregate.
July 4, 1836, to July 7, 1838		$50,000.00
August 2, 1882	$5,000.00	5,000.00
July 4, 1884	5,000.00	10,000.00
August 5, 1886	10,000.00	20,000.00
August 11, 1888	3,000.00	23,000.00
September 19, 1890	5,000.00	28,000.00
July 13, 1892	5,000.00	33,000.00
March 2, 1907	a 2,000.00	35,000.00
Sales	.10	35,000.10

a Allotted from combined appropriation.

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Unit price.	Value.
Cotton	72	$210	$15,120
Cotton seed	190	20	3,800
Cotton-seed meal	50	25	1,250
Clams	475	50	23,750
Eggs	1	300	300
Fertilizers	600	22	13,200
Fish	450	60	27,000
General merchandise	1,500	140	210,000
Grain	50	35	1,750
Hay	40	20	800
Hogs	3	100	300
Lumber	1,090	10	10,900
Oysters	280	35	9,800
Poultry	5	200	1,000
Peanuts	10	60	600
Potatoes	150	20	3,000
Rosin	86	25	2,150
Shingles	1	8	8
Timber	19,400	7	135,800
Wood	100	4	400
Rafting gear	200	80	16,000
Cross-ties	50	7	350
Total	24,803	.....	477,278

Number of passengers carried, 1,500.
No transportation lines established during the year.

Statement of vessels navigating New River, North Carolina, during the calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Launches	25	125	2 to 3½
Sharpies	22	88	1 to 3

(B) INLAND WATERWAY BETWEEN NEW RIVER AND SWANSBORO.

Reference.—See page 295 of current summary.

The U. S. dredge *Scuppernong*, operated by hired labor, began work on this waterway October 21, 1907, and work was suspended on May 22, 1908, for want of funds. During this time there were removed from the Opening 1,233 cubic yards of material from a cut 690 feet long; from Standback, 1,314 cubic yards from a cut 300 feet long; from Sand shoals, 27,287 cubic yards from a cut 5,100 feet long; from

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Ford Cut, 375 cubic yards from a cut 95 feet long; from Dudley's ditch, 22,658 cubic yards from a cut 3,475 feet long, and from cuts west of Dudley's ditch, 27,544 cubic yards from a total length of 6,660 feet, making a total of 80,411 cubic yards of material removed from a total length of 16,320 feet. All cuts were dredged 3 to 4 feet deep at mean low water and 40 feet wide.

The total cost of this work was $12,727.79 (of which $54.93 was outstanding at the end of the year), as follows:

Operating dredge, including towing		$6,812.08
Other expenses charged to the work:		
Purchase of plant	$1,550.00	
Repairs to dredge and scows	1,804.19	
Surveys	814.19	
Local superintendence	848.40	
Main office expenses	898.93	
		5,915.71
Total		12,727.79

Making the cost for operating 8.5 cents per cubic yard, and the total cost for operating and all other expenses 15.8 cents per cubic yard.

This work actually cost $500 less than the above amount, as $500 was originally charged to this portion of the waterway that should have been charged to the portion between Beaufort and Swansboro. It was afterwards refunded, but is still charged included in the cost of the work. Of the total cost, $375 was also received from other works for rent of plant.

A survey of this portion of the waterway was made during April and platted to a scale of 250 feet to the inch.

An additional appropriation of $15,000 is recommended, of which it is proposed to apply about $10,000 to improvement by dredging and about $5,000 to maintenance.

Money statement.

July 1, 1907, balance unexpended		$12,000.00
June 30, 1908, amount of rents and refundments received during fiscal year		875.00
		12,875.00
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$12,172.86	
For maintenance of improvement	500.00	
		12,672.86
July 1, 1908, balance unexpended		202.14
July 1, 1908, outstanding liabilities		54.93
July 1, 1908, balance available		147.21
Amount (estimated) required for completion of existing project		26,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$10,000.00	
For maintenance of improvement	5,000.00	
		15,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

Date.	Amount.	Aggregate.
September 19, 1890	$5,000	$5,000
March 2, 1907	a 12,000	17,000
Rents during 1908	875	17,875

a Allotted from combined appropriation.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	40	$3	$120
Cotton	15	210	3,150
Cotton seed	25	20	500
Cotton-seed meal	30	25	750
Clams	350	50	17,500
Eggs	1	300	300
Fertilizers	200	22	4,400
Fish	300	60	18,000
General merchandise	1,000	140	140,000
Grain	91	35	3,185
Hay	50	20	1,000
Lumber	60	10	600
Oysters	2,400	35	84,000
Potatoes	91	20	1,820
Rosin	357	25	8,925
Turpentine:			
Crude	29	28	812
Spirits	80	145	11,600
Timber	375	7	2,625
Wood	150	4	600
Total	5,644	.....	299,887

No passengers handled. No transportation lines established during the year.

Statement of vessels navigating waterway, New River to Swansboro, N. C., for calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Steamer	1	52	4
Sharpies	25	250	2 to 4
Launches	10	60	2 to 4

c) WATERWAY BETWEEN BEAUFORT HARBOR AND NEW RIVER, I. E., PORTION BETWEEN BEAUFORT AND SWANSBORO.

No active operations were carried on during the year, the $850 being expended for part purchase of plant for use on this and neighboring improvements.

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Money statement.

July 1, 1907, balance unexpended	$5,017.64
June 30, 1908, amount expended during fiscal year for maintenance of improvement	850.00
July 1, 1908, balance unexpended	4,167.64
Amount (estimated) required for completion of existing project	16,040.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$12,000.00
For maintenance of improvement	1,000.00
	13,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Date.	Amount.	Aggregate.	Date.	Amount.	Aggregate.
August 5, 1886	$10,000	$10,000	August 18, 1894	$2,500	$42,500
August 11, 1888	5,000	15,000	June 3, 1896	1,000	43,500
September 19, 1890	15,000	30,000	June 13, 1902	9,500	53,000
July 13, 1892	10,000	40,000	March 2, 1907	[a] 3,000	56,000

[a] Allotted from combined appropriation.

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	100	$3	$300
Coal and minerals	70	5	350
Cotton	252	210	52,920
Cotton seed	325	20	6,500
Cotton-seed meal	105	25	2,625
Clams	1,160	50	58,000
Eggs	2	300	600
Fertilizers	325	22	7,150
Fish	2,096	60	125,760
General merchandise	4,476	140	624,640
Grain	442	35	15,470
Hay	95	20	1,900
Hogs	5	100	500
Lumber	10,120	10	101,200
Machinery	20	100	2,000
Oysters	2,151	35	75,285
Poultry	2	200	400
Peanuts	25	60	1,500
Potatoes	144	20	2,880
Rosin	457	25	11,425
Shingles	68	8	544
Turpentine:			
Crude	71	30	2,130
Spirits	58	145	8,410
Timber	625	7	4,375
Vegetables	200	20	4,000
Wood	1,200	4	4,800
Cattle	10	60	600
Cross-ties	4,500	7	31,500
Soft crabs	70	120	8,400
Total	29,174	.....	1,156,164

Number of passengers transported, none.
No transportation lines established during the year.

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Statement of vessels navigating waterway between Beaufort Harbor and New River during the calendar year ending December 31, 1907.

Class of vessel.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Steamers	15	450	2 to 4
Schooners, etc.	90	900	2 to 4
Launches	50	500	2 to 4

M 11.

IMPROVEMENT OF NORTHEAST (CAPE FEAR) AND BLACK RIVERS AND CAPE FEAR RIVER ABOVE WILMINGTON, NORTH CAROLINA.

(A) NORTHEAST RIVER, NORTH CAROLINA.

Reference.—See page 298 of current summary.

There was no work done during the fiscal year 1907, no plant being available.

Money statement.

July 1, 1907, balance unexpended	$3,023.62
July 1, 1908, balance unexpended	3,023.62
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	3,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

September 19, 1890, for Northeast (Cape Fear) River, North Carolina	$5,000.00
July 13, 1892, for Northeast (Cape Fear) River, North Carolina	5,000.00
August 18, 1894, for Northeast (Cape Fear) River, North Carolina	5,000.00
March 3, 1899, for Northeast River, North Carolina	2,000.00
June 13, 1902, for Northeast River, North Carolina	[a] 2,000.00
Other receipts, March 4, 1897, sales to Cape Fear River	243.33
Allotted from emergency appropriation June 13, 1902	500.00
March 3, 1905	[a] 2,000.00
March 2, 1907	[a] 2,000.00
Total	23,743.33

[a] Allotted from joint appropriation for Northeast and Black rivers, North Carolina, and Cape Fear River, North Carolina, above Wilmington.

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COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	1,877	$3	$5,631
Coal and minerals	25	5	125
Cotton	205	210	43,050
Cotton seed	673	20	13,460
Cross-ties	3,645	7	25,515
Cotton-seed meal	150	25	3,750
Cattle	55	60	3,300
Eggs	12	300	3,600
Fertilizers	27,946	22	614,812
Fish	29	60	1,740
General merchandise	1,753	140	245,420
Grain	151	35	5,285
Hay	103	20	2,060
Hogs	93	100	9,300
Horses	21	100	2,100
Laths	38	10	380
Lumber	5,460	10	54,600
Machinery	27	100	2,700
Piling and poles	285	5	1,425
Poultry	25	200	5,000
Peanuts	347	60	20,820
Potatoes	23	20	460
Rosin	814	25	20,350
Shingles	1,497	8	11,976
Tobacco, leaf	2	200	400
Turpentine:			
Crude	255	28	7,140
Spirits	621	145	90,045
Tar	340	12	4,080
Timber	55,483	7	388,381
Vegetables	4	20	80
Wood	4,645	4	18,580
Total	106,604	.....	1,605,565

No transportation lines established during the year.
No passengers transported.

(B) IMPROVING BLACK RIVER, NORTH CAROLINA.

Reference.—See page 300 of current summary.

There was no work done and no money expended during the fiscal year 1908, no plant being available.

The small appropriations for the past five or six years have not been sufficient to properly maintain the channel.

Money statement.

July 1, 1907, balance unexpended	$3,178.77
July 1, 1908, balance unexpended	3,178.77
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	3,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

Date.	Amount.	Aggregate.	Date.	Amount.	Aggregate.
August 5, 1886	$3,000	$3,000	Allotted from emergency appropriation, June 13, 1902	$500.00	$20,500.00
July 13, 1892	10,000	13,000	March 3, 1905	a 2,000.00	22,500.00
August 17, 1894	2,000	15,000	March 2, 1907	a2,000.00	24,500.00
June 3, 1896	1,000	16,000	Sales, etc	243.34	24,743.34
March 3, 1899	2,000	18,000			
June 13, 1902	a2,000	20,000			

aAllotted from joint appropriation for Northeast and Black rivers, North Carolina, and Cape Fear River, North Carolina, above Wilmington.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	35	$3	$105
Cotton	237	210	49,770
Cotton seed	109	20	2,180
Cotton-seed meal	207	25	5,175
Cross-ties	4,536	7	31,752
Cattle	34	60	2,040
Eggs	15	300	4,500
Fertilizers	822	22	18,084
Fish	1	60	60
General merchandise	3,122	140	437,080
Grain	96	35	3,360
Hay	150	20	3,000
Hogs	43	100	4,300
Horses	1	100	100
Lumber	502	10	5,020
Piling and poles	840	5	4,200
Poultry	16	200	3,200
Peanuts	16	60	960
Potatoes	100	20	2,000
Rice, rough	60	50	3,000
Rosin	4,975	25	124,375
Shingles	2,825	8	22,600
Turpentine:			
Crude	362	28	10,136
Spirits	737	145	106,865
Tar	716	15	10,740
Timber	21,700	7	151,900
Wood	4,948	4	19,792
Total	47,205	.....	1,026,294

No transportation lines established during the year.
Number of passengers handled (estimated), 500.

Statement of vessels navigating Black River, North Carolina, during the calendar year ending December 31, 1907.

Class of vessels.	Number.	Aggregate net tonnage.	Draft.
			Feet.
Steamers	4	126	2.5 to 3.5
Steam tugs	6	94	3.5 to 4.5
Flats (about)	40	3,000	1.5 to 4.5

(c) CAPE FEAR RIVER ABOVE WILMINGTON, N. C.

References.—See page 300 of current summary.

The project of 1881 has been about 30 per cent completed, and no work under it, except for maintenance, has been done for several years. It has been superseded by the canalization project of 1902,

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but, pending the completion of the latter, maintenance work on the former project is being kept up.

There was no work done during the year, no plant being available. The money expended, $149.33, was for expenses of inspection and for office supplies.

Canalization.—The expenses of the year on the canalization project amounted to $373.06, and were for inspection and office expenses.

Money statements.

GENERAL IMPROVEMENT.

July 1, 1907, balance unexpended	$7,520.89
June 30, 1908, amount expended during fiscal year, for maintenance of improvemnt	149.33
July 1, 1908, balance unexpended	7,371.56
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	6,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

LOCKS AND DAMS.

July 1, 1907, balance unexpended	$35,899.17
June 30, 1908, amount expended during fiscal year, for works of improvement	373.06
July 1, 1908, balance unexpended	35,526.11
Amount (estimated) required for completion of existing project	1,300,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	450,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATIONS.

Date.	Amount.	Aggregate.	Date.	Amount	Aggregate.
March 3, 1881	$30,000.00	$30,000.00	June 3, 1896	$5,000.00	$137,250.00
August 2, 1882	30,000.00	60,000.00	March 3, 1899	5,000.00	142,250.00
July 5, 1884	5,000.00	65,000.00	June 13, 1902	50,000.00	192,250.00
August 5, 1886	11,250.00	76,250.00	Do	[a] 6,000.00	198,250.00
August 11, 1888	12,000.00	88,250.00	March 3, 1905	[a] 5,000.00	203,250.00
September 19, 1890	15,000.00	103,250.00	March 2, 1907	[a] 5,000.00	208,250.00
July 13, 1892	15,000.00	118,250.00	Sales, etc	414.33	208,664.33
August 18, 1894	14,000.00	132,250.00			

[a] Allotted from joint appropriations for Northeast and Black rivers, North Carolina, and Cape Fear River, North Carolina, above Wilmington.

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COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	3,625	$3	$10,875
Coal and minerals	25	5	125
Cotton	2,727	210	572,670
Cotton seed	731	20	14,620
Cotton-seed meal	503	25	12,575
Eggs	57	300	17,100
Fertilizers	33,431	22	735,482
Fish	75	60	4,500
General merchandise	13,011	140	1,821,540
Grain	513	35	17,955
Hay	213	20	4,260
Hogs	160	100	16,000
Horses	200	100	20,000
Lumber	11,061	10	110,610
Machinery	100	100	10,000
Poultry	40	200	8,000
Peanuts	50	60	3,000
Potatoes	158	20	3,160
Rosin	2,100	25	52,500
Shingles	551	8	4,408
Tobacco, leaf	50	200	10,000
Turpentine:			
Crude	1,260	28	35,280
Spirits	630	145	91,350
Tar	1,196	15	17,940
Timber	30,064	7	210,448
Vegetables	75	20	1,500
Wood	6,080	4	24,320
Cattle	184	60	11,040
Cross-ties	24,007	7	168,049
Piles and poles	814	5	4,070
Gum logs	5,368	5	26,840
Total	139,059	.....	4,040,217

No transportation lines established during the year.
Number of passengers carried, 3,750.

M 12.

IMPROVEMENT OF CAPE FEAR RIVER, NORTH CAROLINA, AT AND BELOW WILMINGTON.

Reference.—See page 302 of current summary.

The operations of the year have been the work of the suction dredge *Cape Fear* on the ocean bar and Snows Marsh channels, and of the clam-shell dredges *Ajax* and *Hercules*, and the hydraulic dredge *Jacksonville* on the river channels; also repairing of New Inlet and Swash Defense dams, making minor surveys, and caring for plant. All work was done by hired labor and Government plant.

The dredge *Jacksonville* was rented from the Jacksonville, Fla., district, leaving for Wilmington on January 25, 1908. Repairs costing $22,473.14 were made and paid for by Cape Fear River improvement before the dredge left Jacksonville, and Cape Fear River is to have the use of the dredge until the rent at $41 per calendar day equals this amount.

Expenditures of the year were $245,507.50, of which there was outstanding at the beginning of the fiscal year the sum of $29,115.38, leaving $216,392.12 pertaining to the fiscal year 1908. To this there should be added $40,054.44 outstanding at the close of the fiscal year,

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and we obtain the sum of $256,446.56 as the actual expenses incurred during the year.

The sum of $682.08 was received as proceeds of the sale of condemned property, etc. This deducted from the above sum leaves the appropriation reduced by $255,764.48, for which the following work was accomplished:

301,808 cubic yards of sand and mud removed by the dredge *Cape Fear*, at 10.2— cents per cubic yard		$30,672.46
This cost is made up as follows:		
Field cost of operating dredge	$17,054.97	
Special repairs to dredge	11,074.74	
All other expenses chargeable to this work	2,542.75	
352,665 cubic yards of sand and mud removed by the dredge *Jacksonville* at 10.0— cents per cubic yard		35,347.84
This cost is made up as follows:		
Field cost of operating dredge	$24,978.87	
Rent of dredge, 158 days, at $41, paid in making repairs to dredge	6,478.00	
All other expenses chargeable to this work	3,890.97	
660,255 cubic yards of sand and mud removed by the dredge *Hercules*, at 6.6 cents per cubic yard		43,536.38
310 stumps removed by dredge *Hercules*, cost included in dredging; 51 logs removed by dredge *Hercules*, cost included in dredging.		
This cost is made up as follows:		
Field cost of operating dredge and plant	$37,840.73	
All other expenses chargeable to this work	5,695.65	
589,128 cubic yards of sand and mud removed by the dredge *Ajax*, at 6.4+ cents per cubic yard		37,711.29
95 stumps removed by dredge *Ajax*, cost included in dredging.		
42 logs removed by dredge *Ajax*, cost included in dredging.		
This cost is made up as follows:		
Field cost of operating dredge and plant	$32,844.56	
All other expenses chargeable to this work	4,866.73	
19,677 tons of riprap stone placed on Swash Defense dam, at $3.33		65,493.17
100 tons of riprap stone placed on New Inlet dam, at $3.33		333.00
This cost is made up as follows:		
Cost of stone on cars at Wilmington	$37,000.79	
Cost of placing stone on dam	20,968.69	
All other expenses chargeable to this work	7,856.69	
The following items have not been charged into the cost of the work:		
Balance of cost of special repairs made to the dredge *Jacksonville*, due from the Jacksonville district, and to be paid in rent		15,995.14
Last payment on first cost of dredge *Hercules*		19,938.75
Last payment on the cost of two new dump scows		1,986.83
Cost of building two decked scows		4,428.67
Cost of inspecting two dump scows now being built		320.95
Total cost of year's work		255,764.48

The dredge *Jacksonville* also rehandled 109,538 cubic yards of material for the dredge *Hercules*, the cost of which was deducted from the cost of the *Jacksonville's* work and included in the cost of the *Hercules'* work.

The river slope and apron of Swash Defense dam was coped for a length of about 1,200 feet, the cost of which is included in the cost of stone placed on this dam.

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There was removed from the river channel during the year material as follows:

	Material.	Stumps.	Logs.
	Cubic yds.		
To obtain 20 feet depth and 270 feet width	581,774	5	20
To obtain 22 feet depth and 148 feet width	975,378	400	73
For maintenance	301,808	.....	.....
From channels to dump grounds	44,896	.....	.....
Total	1,903,856	405	93

The cost of removing this 1,903,856 cubic yards of material, not including the cost of plant purchased during the year and allowing nothing for deterioration of plant, was $147,267.97, or 7.7+ cents per cubic yard. The estimated value of the dredging plant belonging to Cape Fear River improvement is $190,000. Adding 10 per cent of this value, $19,000, to the cost of the year's work for deterioration and deducting $11,074.74, the cost of special repairs made to plant during the year, we have the actual cost of the dredging, including deterioration of plant, 8.2− cents per cubic yard.

The estimated value of the plant used in connection with the repairs to the dams is $8,000. Adding 10 per cent of this value to $65,826.17, the cost of the 1,977 tons of stone placed on the dams during the year, we have the cost, including deterioration, $3.37− per ton.

As a result of the year's work, the ocean bar and Snows Marsh channels have been maintained and the available depth at Snows Marsh increased from 18 to 20 feet. The widths of the 20-foot mean low-water channels have been increased as follows:

Name of shoal.	From—	To—
	Feet.	*Feet.*
Alligator Creek shoal	259	270
Brunswick River shoal[a]	259	270
Logs and Big Island shoal	259	270
Midnight shoal	148	270

[a] 5,000 feet of its length.

Channels 22 to 24 feet deep at mean low water have been dug through the following shoals:

Name of shoal.	Width.	Name of shoal.	Width.
	Feet.		*Feet.*
Alligator Creek shoal	148	Lilliput shoal, upper 2,400 feet	148
Brunswick River shoal	148	Lilliput shoal, middle 5,000 feet	74
Logs and Big Island shoal	148	Old Brunswick Cove shoal	74
Keg Island shoal	148		

With the available balance it is proposed to complete repairs to the dams, maintain the present dredged channels, and continue the project in accordance with House Document 545, Fifty-ninth Congress, first session.

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An additional appropriation of $400,000 for continuing improvement and for maintenance, exclusive of the $100,000 balance of the appropriation for continuing improvement provided for in the river and harbor act of March 2, 1907, is asked for.

Money statement.

July 1, 1907, balance unexpended		$374,896.72
Amount appropriated by sundry civil act approved May 27, 1908		150,000.00
Amount received from sales, etc., during year		682.08
		525,578.80
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$195,507.50	
For maintenance of improvement	50,000.00	
		245,507.50
July 1, 1908, balance unexpended		280,071.30
July 1, 1908, outstanding liabilities		40,054.44
July 1, 1908, balance available		240,016.86
July 1, 1908, amount covered by uncompleted contracts		25,685.91
Amount (estimated) required for completion of existing project		[a] 250,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	[b] $435,000.00	
For maintenance of improvement	65,000.00	
		500,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

Date.	Amount.	Aggregate.	Date.	Amount.	Aggregate.
March 2, 1829, to July 22 1854		[c] $363,228.92	September 19, 1890	$170,000.00	$2,275,000.00
			July 13, 1892	200,000.00	2,475,000.00
			August 18, 1894	200,000.00	2,675,000.00
July 11, 1870	$100,000.00	100,000.00	June 3, 1896	195,000.00	2,870,000.00
March 3, 1871	75,000.00	175,000.00	March 3, 1899	150,000.00	3,020,000.00
June 10, 1872	100,000.00	275,000.00	June 13, 1902	150,000.00	3,170,000.00
March 3, 1873	100,000.00	375,000.00	Allotted from maintenance appropriation act April 28, 1904	30,000.00	3,200,000.00
June 23, 1874	150,000.00	525,000.00			
March 3, 1875	150,000.00	675,000.00			
August 14, 1876	132,500.00	807,500.00	March 3, 1905	150,000.00	3,350,000.00
June 18, 1878	160,000.00	967,500.00	June 30, 1906 (sundry civil act)	200,000.00	3,550,000.00
March 3, 1879	100,000.00	1,067,500.00			
June 14, 1880	70,000.00	1,137,500.00	March 2, 1907	165,000.00	3,715,000.00
March 3, 1881	140,000.00	1,277,500.00	March 4, 1907 (sundry civil act)	100,000.00	3,815,000.00
August 2, 1882	225,000.00	1,502,500.00			
July 5, 1884	200,000.00	1,702,500.00	May 27, 1908 (sundry civil act)	150,000.00	3,965,000.00
August 5, 1886	157,500.00	1,860,000.00			
August 11, 1888	245,000.00	2,105,000.00	Sales, rents, etc	33,005.66	3,998,005.66

[a] This represents only the amount yet to be appropriated under authorization of March 2, 1907, for prosecuting the project then adopted for completing the 20-foot channel and securing such additional depth as funds permit.
[b] $100,000 provided for in sundry civil bill.
[c] Balance of $3,728.07 turned over to surplus fund.

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CONTRACTS IN FORCE.

STONE.

Contractor: Winnsboro Granite Corporation, Charleston, S. C.
Date of contract: June 1, 1907.
Date of approval: June 19, 1907.
Date of commencement: June 26, 1907.
Date of completion: In force, under extension.
For delivery of about 20,000 tons of stone, at Wilmington, N. C., for use in repairs to dams at mouth of Cape Fear River, N. C.

SCOWS.

Contractor: Sanford & Brooks Company, Baltimore, Md.
Date of contract: February 11, 1908.
Date of approval of contract: February 25, 1908.
Date of commencement: Unknown.
Date of completion: In force.
For constructing and delivering 2 bottom-dump scows at Wilmington, N. C., for use in Cape Fear River.

COMMERCIAL STATISTICS FOR YEAR ENDING DECEMBER 31, 1907.

Exports.

Class of goods.	Tons.	Price.	Value.
FOREIGN AND COASTWISE.			
Furnished by Wilmington Chamber of Commerce and Col. J. L. Cantwell.]			
Cotton	117,000	$210	$24,570,000
Lumber	64,880	10	648,800
Gum logs	5,368	5	26,840
Poplar wood	660	5	3,300
Cross-ties	30,180	7	211,260
Shingles	4,265	8	34,120
Rosin	16,056	25	401,400
Tar	5,016	15	75,240
Turpentine:			
Spirits	4,385	145	635,825
Crude	242	28	6,776
Pitch	153	12	1,836
Peanuts	375	60	22,500
Fish oil	254	75	19,050
Coal	3,544	5	17,720
Miscellaneous, (dry goods, groceries, etc.)	53,346	140	7,468,440
Total	305,724	.....	34,143,107
INTERNAL.			
[Furnished by steamboat, flat, and raft men.]			
Cotton-seed meal	860	25	21,500
Brick	537	3	1,611
Hay	466	20	9,320
Fertilizer and fertilizer materials	62,199	22	1,368,378
General merchandise	17,886	140	2,504,040
Coal	50	5	250
Grain	760	35	26,600
Machinery	127	100	12,700
Total	82,885	.....	3,944,399
Total exports, foreign, coastwise, and internal	388,609	.....	38,087,506

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Imports.

Class of goods.	Tons.	Price.	Value.
FOREIGN AND COASTWISE.			
[Furnished by importers and manufacturers.]			
Fertilizer and fertilizer materials	116,541	$22	$2,563,902
Coal	11,220	5	56,100
Salt	6,797	10	67,970
Oil and gasoline	30,037	35	1,051,295
Cement	23,750	10	237,500
Molasses	1,200	50	60,000
Grain, corn, and rice	521	35	18,235
Cotton	950	210	199,500
Turpentine, spirits	426	145	61,770
Rosin	1,050	25	26,250
Tar	435	12	5,220
Fish and clams	5,618	20	112,360
Fish oil	210	75	15,750
Cotton bagging	413	100	41,300
Lumber	10,426	10	104,260
Wood	300	4	1,200
General merchandise (dry goods, groceries, hardware, etc.)	35,995	140	5,039,300
Miscellaneous (country produce, fruit, straw, shingles, etc.)	5,000	75	375,000
Stone	20,077	2	40,154
Timber and cross-ties	1,000	7	7,000
Total	271,966	.....	10,084,066
INTERNAL.			
[Furnished by steamboat, flat, and raft men.]			
Cotton	3,169	210	665,490
Cotton seed	1,513	20	30,260
Turpentine:			
Spirits	1,988	145	288,260
Crude	1,877	28	52,556
Rosin	7,889	25	197,225
Tar	2,252	12	27,024
Timber	107,247	7	750,729
Lumber	17,023	10	170,230
Shingles	4,873	8	38,984
Poles and piles	1,939	5	9,695
Cross-ties	32,188	7	225,316
Wood	15,673	4	62,692
Brick	5,000	3	15,000
Miscellaneous (country produce, etc.)	1,982	.....	159,020
Gum logs	5,368	5	26,840
Total	209,981	.....	2,719,221
Total imports, foreign, coastwise, and internal	481,947	.....	12,803,287

Summary.

	Tons.	Value.
EXPORTS.		
Foreign and coastwise	305,724	$34,143,107.00
Internal	82,885	3,944,399.00
IMPORTS.		
Foreign and coastwise	271,966	10,084,066.00
Internal	209,981	2,719,221.00
Total commerce	870,556	50,890,793.00
Gain since last year	56,265	8,206,477.25

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Statement of vessels navigating Cape Fear River, North Carolina, at and below Wilmington, during calendar year ending December 31, 1907.

Class of vessel.	American.		Foreign.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Steamships	130	159,993	64	132,974	194	292,967
Barks	3	1,271	1	662	4	1,933
Brigs	2	726			2	726
Barges	11	19,217			11	19,217
Schooners	87	40,374	8	1,577	95	41,951
Total	233	221,581	73	135,213	306	356,794

The above does not include vessels coming to Southport in distress for supplies or for harbor, the total estimated tonnage of which is 20,000 tons.

Vessels owned by the United States Government are not included. No record is made of steamboats plying on the rivers above and below Wilmington or of steam tugs and small vessels of less than 100 net tons.

Freight transported.

Calendar year ending December 31—	Tons.	Calendar year ending December 31—	Tons.
1869	220,000	1898	627,899
1889	325,512	1899	621,852
1890	346,557	1900	699,356
1891	344,443	1901	727,359
1892	341,468	1902	841,631
1893	392,965	1903	843,337
1894	437,623	1904	856,011
1895	618,054	1905	871,106
1896	673,208	1906	814,291
1897	595,426	1907	870,556

Foreign commerce for the calendar year 1907.

[Furnished by the collector of customs of the port of Wilmington, N.C.]

Class of goods.	Quantity.	Value.	
		Exports.	Imports.
Oranges.....pounds..	53,600		$670
Miscellaneous small items			1,111
Potash, sulphate of.....tons..	504		21,850
Peruvian guano.....do....	2,135		24,954
Sulphur ore.....do....	10,898		32,035
Ammonia, sulphate of.....pounds..	2,240,000		62,384
Burlaps.....do....	825,061		63,187
Potash, muriate of.....tons..	5,249		193,733
Kainit.....do....	37,412		253,482
Tar.....barrels..	1,100	$2,780	
Hewn timber.....cubic feet..	699,000	13,418	
Gum logs.....feet B. M..	1,496,000	85,000	
Lumber.....do....	4,218,000	89,302	
Rosin.....barrels..	57,959	242,310	
Cotton.....pounds..	214,875,287	26,465,800	
Total		26,898,610	663,406

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Cotton steamers loaded at the port of Wilmington, N. C., during the calendar year ending December 31, 1907.

[Furnished by Messrs. Alexander Sprunt & Son.]

Name of steamer.	Registered tonnage.	Draft loaded.	Number of bales.	Tons of coal.
		Ft. in.		
Bertholey	2,432	18 3	13,465	320
Anglo-Chilian	2,441	19 8	13,300	.....
Cayo Largo	2,223	20 2	12,108	.....
Headlands	1,932	18 3	9,802	.....
Haxby	2,252	19	10,221	.....
Arroyo	2,307	20	10,529	.....
Anglo-Saxon	2,671	20 6	16,222	.....
Mariner	1,523	17	9,526	.....
Newbiggin	2,443	19 3	13,000	560
Carperby	1,344	15 3	6,450	.....
Tugela	2,148	19	11,773	83½
Sierra Blanca	2,337	20 10	13,596	.....
Carmelina	1,052	16	4,028	150
Cardigan	2,691	18 7	14,625	.....
Thomas Wayman	1,414	17 9	6,614	43
King George	2,479	18 11	12,936	.....
Jura	2,397	21 7	13,706	.....
Glanton	1,940	17 6	9,539	66
Inca	1,931	18	9,900	.....
Yanariva	2,154	18 8	10,100	.....
Crusader	2,744	20 6	14,050	.....
Invertay	2,541	21 1	15,500	.....
Glenfruin	2,025	18	11,519	.....
Fashoda	1,782	17 7	9,300	458
Tabaristan	1,836	21	9,350	.....
Edernian	2,284	18	12,427	.....
Osceola	2,318	19 8	13,725	.....
Gorjistan	2,900	20 10	14,933	.....
Sahara	2,664	19 6	13,195	.....
Torgorm	1,095	15 8	5,255	249
Venetia	2,333	19 8	12,600	499
Dinsdalehall	2,534	19 7	13,840	81
Rubens	2,321	18 8	12,100	30
Hillmere	2,299	20 11	13,538	.....
Lord Derby	2,401	19 10	15,013	.....
Dacre Hill	1,713	16 10	10,087	.....
England	2,471	16 2	13,200	105
Petunia	1,693	16 5	5,423	295
Total	81,434	.....	438,421	2,924½

M 13.

IMPROVEMENT OF SHALLOTTE RIVER, NORTH CAROLINA.

References.—See page 305, current summary.

Active work of improvement began June 21, 1908, and there were removed during the remainder of the fiscal year, by the U. S. dredge *Scuppernong*, operated by hired labor, a total of 9,878 cubic yards, place measurement, from a cut 40 feet wide, 4 feet deep at mean low water, and 1,750 feet long.

The cost of the work accomplished was $1,189.94, of which $1,082.31 is outstanding. This cost includes repairs made to the dredge before starting the work and the cost of towing the dredge from New River to Wilmington and from Wilmington to Shallotte River.

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Money statement.

July 1, 1907, balance unexpended	$2,950.80
June 30, 1908, amount expended during fiscal year for works of improvement	107.63
July 1, 1908, balance unexpended	2,843.17
July 1, 1908, outstanding liabilities	1,082.31
July 1, 1908, balance available	1,760.86
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	3,000.00

APPROPRIATION.

Date.	Amount.	Aggregate.
March 2, 1907	$3,000	$3,000

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

Class of goods.	Tons.	Price.	Value.
Brick	2	$3	$6
Coal and minerals	140	5	700
Cotton	66	210	13,860
Cotton-seed oil	2	140	280
Cotton-seed meal	6	25	150
Clams	104	50	5,200
Eggs	25	300	7,500
Fertilizers	306	22	6,732
Fish	3	60	180
General merchandise	2,068	140	289,520
Grain	2	35	70
Hay	50	20	1,000
Hogs	90	100	9,000
Machinery	434	100	43,400
Oysters	450	35	15,750
Poultry	6	200	1,200
Peanuts	57	60	3,420
Potatoes	60	20	1,200
Rosin	2,870	20	57,400
Turpentine, spirits	332	140	46,480
Tar	277	12	3,324
Timber	1,650	6	9,900
Wood	150	3	450
Poles	30	5	150
Total	9,180	.....	516,872

No statistics of passengers handled.
No list of vessels navigating Shallotte River has been obtained.

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APPENDIX N.

IMPROVEMENT OF RIVERS AND HARBORS IN THE CHARLESTON, SOUTH CAROLINA, DISTRICT.

REPORT OF CAPT. E. R. STUART, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Waccamaw River, North Carolina and South Carolina, and Little Pedee River, South Carolina.
2. Lynch River and Clark Creek, South Carolina.
3. Great Pedee River, South Carolina.
4. Winyah Bay, South Carolina.
5. Mingo Creek, South Carolina.
6. Santee, Wateree, and Congaree rivers, and Estherville-Minim Creek Canal, South Carolina.
7. Operating and care of lock and dam across Congaree River, South Carolina.
8. Inland waterways between Charleston Harbor, South Carolina, and opposite McClellanville, South Carolina.
9. Harbor at Charleston, South Carolina.

UNITED STATES ENGINEER OFFICE,
Charleston, S. C., July 15, 1908.

SIR: I have the honor to inclose herewith my annual reports for the fiscal year 1908, for the works of improvement of rivers and harbors in this district.

Very respectfully,

E. R. STUART,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

N 1.

IMPROVEMENT OF WACCAMAW RIVER, NORTH CAROLINA AND SOUTH CAROLINA, AND LITTLE PEDEE RIVER, SOUTH CAROLINA.

(A) WACCAMAW RIVER.

From the beginning of the fiscal year until August 26 dredge *No. 3* was undergoing authorized repairs. On August 27 dredging was begun at Loggy Creek Cut-off, and continued work at this place until November 25, widening the cut, removing a total of 21,066 cubic yards of material and 21 stumps. On November 29 dredging was begun at Thoroughfare Cut-off, and at the close of the fiscal

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year there had been removed from this cut a total of 41,218 cubic yards of material, 8 logs, and 133 stumps, the dredging being done in very difficult material.

During the year a hand force working ahead of the dredge on the line of the Thoroughfare Cut-off removed a total of 3,095 trees, 620 cords of brush, 3,477 logs, 1,027 stumps, and 242 snags. In this work there were pulled by steam 1,487 trees and 1,977 logs, the snag boat *Wateree* assisting the hand force during the month of May. There were removed by blasting 380 stumps.

The total expenditures for the year were $12,940.51, all of which was for works of improvement.

Money statement.

July 1, 1907, balance unexpended	$15,432.22
June 30, 1908, amount expended during fiscal year for works of improvement	12,940.51
July 1, 1908, balance unexpended	2,491.71
July 1, 1908, outstanding liabilities	461.98
July 1, 1908, balance available	2,029.73
Amount (estimated) required for completion of existing project	28,800.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	20,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

June 14, 1880	$15,000	August 18, 1894	$6,000
March 3, 1881	10,000	June 3, 1896	6,000
August 2, 1882	4,400	March 3, 1899	3,000
July 5, 1884	6,000	June 13, 1902 (allotment)	9,000
August 5, 1886	15,000	March 3, 1905 (allotment)	13,800
August 11, 1888	15,000	March 2, 1907 (allotment)	18,000
September 19, 1890	12,500		
July 13, 1892	10,000	Total	143,700

COMMERCIAL STATISTICS, 1907.

Articles.	Quantity.	Value.
Outward freights:	*Tons.*	
Naval stores	4,000	$120,000
Cotton	3,400	680,000
Timber, lumber, etc	253,000	1,265,000
Fish, game, vegetables, etc	916	91,600
Rice and rice flour	1,000	83,000
Miscellaneous	3,400	340,000
Total	265,716	2,579,600
Inward freights: Fertilizers, railroad supplies, etc	29,419	1,470,950
Grand total	295,135	4,050,550

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(B) LITTLE PEDEE RIVER.

No work was done during the year.

Money statement.

July 1, 1907, balance unexpended	$1,646.99
July 1, 1908, balance unexpended	1,646.99
Amount (estimated) required for completion of existing project	23,300.00
Amount that can be profitable expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

August 11, 1888	$5,000	June 13, 1902 (allotment)	$1,500
September 19, 1890	5,000	March 3, 1905 (allotment)	1,200
July 13, 1892	5,000	March 2, 1907 (allotment)	2,000
August 18, 1894	4,000		
June 3, 1896	3,000	Total	26,700

COMMERCIAL STATISTICS, 1907.

Articles.	Quantity.	Value.
Outward freights:	*Tons.*	
Cotton and cotton seed	150	$32,000
Timber, lumber, and cross-ties	8,800	82,000
General merchandise and fertilizers	2,020	44,750
Total	10,970	158,750
Inward freights: General merchandise and fertilizers	3,543	84,500
Grand total	14,513	243,250

N 2.

IMPROVEMENT OF LYNCH RIVER AND CLARK CREEK, SOUTH CAROLINA.

During July and August a lighter was prepared to work on these streams. In October the snagging plant was towed to Clark Creek, and began work on the 26th of October, clearing about 8 miles of the channel of Clark Creek via Lawrence Cut to within about 1 mile of the Great Pedee River. Work was suspended on November 27, 1907. There were removed 2,790 obstructions. In June, 1908, preparations were made for the resumption of operations.

Money statement.

July 1, 1907, balance unexpended	$1,855.42
June 30, 1908, amount expended during fiscal year for works of improvement	1,225.67
July 1, 1908, balance unexpended	629.75

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APPROPRIATIONS.

August 11, 1888	$2,500	March 2, 1907	$2,000
September 19, 1890	2,500		
July 13, 1892	2,500	Total	9,500

COMMERCIAL STATISTICS, 1907.

The commerce of the river consists of rafted timber, which amounted to 1,500 tons, valued at $15,000.

N 3.

IMPROVEMENT OF GREAT PEDEE RIVER, SOUTH CAROLINA.

During the entire year the dredge *Cheraw* (formerly the *Reid Whitford*) was engaged on dredging on this stream, removing in original dredging the following quantities at—

	Cubic yards.
Cheraw Bay	2,125
Rogers shoal	20,380
Whirligig shoal	27,445
Snowdens shoal	18,346
Buzzards bar shoal	40,505
Famine Falls shoal	12,198
Sugarloaf shoal	13,249
Old River shoal	13,400
	147,648

and in redredging at—

	Cubic yards.
Jacobs Island shoal	10,944
Terrills shoal	9,837
Mother Griffin shoal	22,130
Sugarloaf shoal	680
	43,591

making a total of 191,239 cubic yards of material removed during the year.

During portions of the year the snag boats *Wateree*, *Great Pedee*, and *Little Pedee* were engaged in clearing obstructions from the river, removing a total of 965 trees, and 18 cords of brush from the banks, and from the channel 1,150 logs, 567 stumps, and 1,145 snags, an aggregate of 3,815 obstructions during the year.

Both dredging and snagging were seriously delayed by the long-continued period of high water during the winter.

A stern-wheel wood boat was completed and placed on duty supplying the dredge and hoisters with wood.

A new line of steamers was established on the river, operating between Cheraw and Georgetown, S. C.

An old wooden bridge across the Great Pedee River near Society Hill having been reported as an obstruction to navigation, a public hearing was held at Society Hill, and the matter referred to the Secretary of War, under whose authority the owners were given the option of placing proper safeguards at the bridge or removing it. They chose the latter course, and a sufficient portion of the bridge has been removed to provide a clear channel for navigation.

During the year the construction of a hydraulic dredge, of which the appropriations for this river bears a part of the cost, was begun.

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Money statement.

July 1, 1907, balance unexpended		$70,488.09
Amount appropriated by sundry civil act approved May 27, 1908		11,300.00
		81,788.09
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$32,153.98	
For maintenance of improvement	7,246.49	
		39,400.47
July 1, 1908, balance unexpended		42,387.62
July 1, 1908, outstanding liabilities		3,450.05
July 1, 1908, balance available		38,937.57
July 1, 1908, amount covered by uncompleted contracts		4,100.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908		10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 14, 1880	$7,000.00	April 28, 1904	$10,000.00
March 3, 1881	6,000.00	March 3, 1905	15,000.00
August 2, 1882	6,000.00	March 3, 1905	5,000.00
July 5, 1884	8,000.00	March 2, 1907	20,000.00
August 5, 1886	20,000.00	March 4, 1907	30,000.00
August 11, 1888	20,000.00	May 27, 1908	11,300.00
September 19, 1890	12,500.00		
July 13, 1892	10,000.00	Total appropriations	265,300.00
August 18, 1894	6,000.00	Refundment of overpayment	.28
June 3, 1896	12,000.00		
March 3, 1899	4,000.00	Total receipts	265,300.28
June 13, 1902	22,500.00		
March 3, 1903	40,000.00		

CONTRACT IN FORCE.

Name of contractor: Ellicott Machine Company, Baltimore, Md.
Contract for: Machinery and appliances for hydraulic dredge.
Price: Total, $20,500 (Great Pedee River portion, $4,100).
Date of contract: January 10, 1908.
Date of beginning: January 26, 1908.
Date of expiration: September 26, 1908.

COMMERCIAL STATISTICS, 1907.

Articles.	Quantity.	Value.
Outward freights:	*Tons.*	
Naval stores	400	$16,000
Cotton	2,000	400,000
Lumber, timber, etc.	202,890	533,363
Miscellaneous	2,000	70,660
Total	207,290	1,020,023
Inward freights: Miscellaneous merchandise and fertilizers	22,608	937,365
Grand total	229,898	1,957,388

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N 4.

IMPROVEMENT OF WINYAH BAY, SOUTH CAROLINA.

The dredge *Winyah Bay* was at Charleston, S. C., undergoing repairs from August 6 to September 12, 1907, and at Charleston, S. C., at work dredging from November 12, 1907, to February 25, 1908. During the remainder of the year the dredge worked at Winyah Bay and Georgetown, removing a total of 223,222 cubic yards of material, distributed as follows:

	Cubic yards.
Jetty channel at entrance	42,903
Eastern channel	120,158
Sampit River shoal	60,161

The cost was as follows:

Ordinary expenses, including pay roll, provisions, coal, ordinary repairs, and supplies	$26,786.64
Pay roll and all expenses connected with annual repairs and renewals and additions to outfit	5,836.38
	32,623.02

The U. S. dredge *No. 1* worked the entire year, except when laid up for necessary repairs, on the Sampit River shoal and at Georgetown Harbor. This dredge removed a total of 82,133 cubic yards of material and 6,836 cubic yards of small stumps and roots, considered as common excavation; 244 logs, and 565 stumps exceeding 48 inches in diameter. The distributed cost is as follows:

88,969 cubic yards dredged, at 15 cents	$13,345.35
244 logs, at $2 each	488.00
565 stumps exceeding 48 inches in diameter, at $9.95	5,621.75
	19,455.10

The only bid received in response to advertisement for the work performed by dredge *No. 1* was 19.9 cents per cubic yard for dredging and $17.50 each for stumps exceeding 48 inches in diameter.

In addition to the above expenditures there was expended from the Winyah Bay appropriation, and not directly chargeable to current expenses of dredging, the following:

Coal purchased, but not used	$1,497.00
Permanent improvements and additions, including dredge dipper, drum, hauling out ways at Smithville, new machine shed, additions and renewals to sawmill, etc	6,027.65
Rebuilding two dump lighters	1,800.00
Surveys, superintendence, care of property, general repairs, additions and renewals of outfit and quarters at Smithville and North Island, repairs and operation of steamer *Carolina*	9,606.80

making aggregate expenditures of $71,009.57, of which $41,732.15 is chargeable to works of improvement and $29,277.42 to maintenance. The dredging at the Sampit River shoal is about five-eighths completed. There remains about five months' work for the dredge *Winyah Bay*.

The latest survey, made in March, 1908, shows some deterioration of the dredged channel, especially in the vicinity of beacon No. 0. Between that point and beacon No. 1 are several small areas in the channel where the depths are slightly less than 15 feet. These

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shoal places will be removed by the *Winyah Bay* early in the next fiscal year. Work will be continued on the Sampit River shoal with dredge *No. 1*.

Money statement.

July 1, 1907, balance unexpended		$119,344.76
Received, account sales and overpayment		4.62
		119,349.38
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$41,732.15	
For maintenance of improvement	29,277.42	
		71,009.57
July 1, 1908, balance unexpended		48,339.81
July 1, 1908, outstanding liabilities		6,950.83
July 1, 1908, balance available		41,388.98
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908		15,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

August 5, 1886	$18,750.00	April 28, 1904	$70,000.00
August 11, 1888	100,000.00	March 3, 1905	75,000.00
September 19, 1890	100,000.00	March 3, 1905	10,000.00
July 13, 1892	100,000.00	March 2, 1907	30,000.00
August 18, 1894	110,000.00	March 4, 1907	72,750.00
June 3, 1896	20,000.00		
June 4, 1897	350,000.00	Total appropriations	2,485,000.00
July 1, 1898	450,000.00	Received on account of auction sales, rent of dredge, etc	6,252.36
March 3, 1899	58,500.00		
June 6, 1900	285,000.00	Total receipts	2,491,252.36
March 3, 1901	500,000.00		
June 28, 1902	35,000.00		
March 3, 1903	100,000.00		

COMMERCIAL STATISTICS, 1907.

Arrivals and clearances of vessels and commerce at Georgetown, S. C., January 1 to December 31, 1907.

	Arrived.			Cleared.		
	Number.	Tonnage.	Crew.	Number.	Tonnage.	Crew.
Coastwise: American vessels	806	1,038,694	12,680	736	945,673	12,301
Foreign ports:						
American vessels				1	435	10
Foreign vessels	2	332	14	2	332	14
Total	808	1,039,026	12,694	739	946,440	12,325

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Commerce through Winyah Bay, South Carolina, calendar year 1907.

Article.	Quantity.	Value.
Outward freights:	*Tons.*	
Naval stores	7,067	$306,685
Cotton	2,218	487,796
Lumber, timber, etc.	327,253	2,618,025
Rice	223	20,070
Miscellaneous	1,154	1,500,000
Total	337,915	4,932,575
Inward freights: Miscellaneous merchandise, fertilizers, etc	45,000	4,500,000
Grand total	382,915	9,432,575

N 5.

IMPROVEMENT OF MINGO CREEK, SOUTH CAROLINA.

Under an allotment of $300 from the emergency appropriation provided by the river and harbor act of March 2, 1907, work was begun in April, 1908, clearing the channel of Mingo Creek between Hemingway's bridge and the mouth of the river. During the months of April and May there were removed from the banks 497 trees and 41 cords of brush, and from the channel 230 logs, 61 stumps, and 190 snags, making a total of 1,019 obstructions removed, clearing the channel of the worst obstructions. This work is said by owners and agents of steamers to be of great benefit to the navigation of the stream. The small balance is held for future work.

Money statement.

Allotted March 18, 1908	$300.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	257.75
July 1, 1908, balance unexpended	42.25

APPROPRIATIONS.

August 11, 1888	$5,000	March 2, 1907 (allotted Mar. 18, 1908)	$300
September 19, 1890	5,000		
July 13, 1892	3,000	Total	17,600
August 18, 1894	4,000		
March 3, 1905 (allotment)	300		

COMMERCIAL STATISTICS, 1907.

Article.	Quantity.	Value.
Outward freights:	*Tons.*	
Naval stores	2,750	$170,000
Cotton	1,500	360,000
Lumber, timber, etc.	2,000	50,000
Miscellaneous	3,000	150,000
Total	9,250	730,000
Inward freights: Miscellaneous merchandise and fertilizers	12,000	540,000
Grand total	21,250	1,270,000

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N 6.

IMPROVEMENT OF SANTEE, WATEREE, AND CONGAREE RIVERS, SOUTH CAROLINA.

(A) SANTEE RIVER.

The U. S. dredge *No. 2* worked in the Estherville-Minim Creek canal during the entire year, removing a total of 73,312 cubic yards of material and 211 stumps and logs; this work in widening and deepening the canal between the Winyah Bay end and station 118. The expenditures on this portion of the work were $6,886.83.

There was expended $1,211.02 in repairs to snag boat *Great Pedee* for future work on this stream. The sum of $6,524.47 was expended in superintendence and surveys and in repairs to sawmill plant at Smithville.

During the year work was begun on the construction of a suction dredge, of which the appropriation for this river bears a portion of the cost; for this there were expended $1,077.70.

The total expenditures for the year were $15,752.52, of which $12,400.42 was for works of improvement, and $3,352.10 was for maintenance.

Money statement.

July 1, 1907, balance unexpended		$36,884.64
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$12,400.42	
For maintenance of improvement	3,352.10	
		15,752.52
July 1, 1908, balance unexpended		21,132.12
July 1, 1908, outstanding liabilities		1,527.01
July 1, 1908, balance available		19,605.11
July 1, 1908, amount covered by uncompleted contracts		3,416.67
Amount (estimated) required for completion of existing project		109,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908		20,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

March 3, 1881	$22,000.00	June 13, 1902	$15,000.00
August 3, 1882	20,000.00	June 13, 1902 (allotment)	7,000.00
July 15, 1884	15,000.00	March 3, 1905 (allotment)	25,000.00
August 5, 1886	18,750.00	March 2, 1907 (allotment)	33,000.00
August 11, 1888	24,000.00		
September 19, 1890	30,000.00	Total appropriations	347,750.00
July 13, 1892	30,000.00	Account of sales at auction, etc	32.50
August 18, 1894	40,000.00		
June 3, 1896	48,000.00	Total receipts	347,782.50
March 3, 1899	20,000.00		

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CONTRACT IN FORCE.

For contract in force, see Great Pedee River (Santee portion, $3,416.67).

COMMERCIAL STATISTICS. 1907.

Articles.	Quantity.	Value.
Outward freights:	*Tons.*	
Naval stores	7,000	$140,000
Cotton	250	70,000
Lumber, timber, and cord wood	450,000	575,000
Cross-ties	2,000	9,000
Fish and game	1,000	10,000
Miscellaneous	3,000	160,000
Rice	4,000	16,000
Total	467,250	980,000
Inward freights, miscellaneous general merchandise	a 7,500	755,000
	474,750	1,735,000

a Of this, 4,500 tons, valued at $450,000, is through freight for the Congaree River, South Carolina.

(B) WATEREE RIVER.

Work was suspended on August 12, 1907, due to health conditions, the master of the boat having died of malaria July 26. Snagging was resumed by the snag boat *Wateree* January 11, and continued work until March 30, being greatly delayed by continuous high water. Snagging was again resumed in June. During the year there were removed from the banks 722 trees and 9½ cords of brush, and from the channel 713 logs, 255 stumps, 720 large snags, and 6 cords of small snags. This snagging was done at a total cost of $5,724.23.

The construction of a suction dredge, of which the appropriation for this river bears a part of the cost, was begun. For this there were expended $2,083.15.

Preparations were also begun for the construction of a snag boat for use on this stream. Expenditures amounted to $245.18.

For superintendence, repairs to plant and property, etc., there were expended $3,432.10.

Money statement.

July 1, 1907, balance unexpended	$57,527.64
June 30, 1908, amount expended during fiscal year for maintenance of improvement	11,484.66
July 1, 1908, balance unexpended	46,042.98
July 1, 1908, outstanding liabilities	2,269.25
July 1, 1908, balance available	43,773.73
July 1, 1908, amount covered by uncompleted contracts	12,612.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	20,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

March 3, 1881	$8,000	August 18, 1894	$2,500
August 2, 1882	15,000	June 3, 1896	5,000
July 5, 1884	5,000	March 3, 1899	2,500
August 5, 1886	7,500	March 3, 1905 (allotment)	25,000
August 11, 1888	12,000	March 2, 1907 (allotment)	50,000
September 19, 1890	12,500		
July 13, 1892	2,500	Total	147,500

CONTRACT IN FORCE.

Name of contractor: C. B. Colbert, Georgetown, S. C.
Contract for machinery for snag boat.
Price: $8,512.
Date of contract: March 2, 1908.
Date of beginning: March 3, 1908.
Date of expiration: July 15, 1908.
See also Great Pedee River (Wateree River portion, $4,100).

COMMERCIAL STATISTICS, 1907.

Articles.	Quantity.	Value.
Outward freights, timber	*Tons.* 56,400	$564,000

This constitutes the entire commerce of the stream at present.

(c) CONGAREE RIVER.

Snagging operations were prosecuted between July 1 and August 14, and again between November 2 and December 21. The snag boats *Great Pedee* and *Wateree* removed from the banks 453 trees, and from the channel 526 logs, 231 stumps, 377 large snags, and 9 cords of small snags. The expenditures for this work were $4,588.55.

Toward the construction of a new dredge there was an expenditure of $3,812.31, and for wood boat $438.50; in repairs to snag boats and sawmill at Smithville expenditures amounting to $3,596.69 were made.

Above the United States lock and dam at Granby the channel was badly obstructed by outcropping granite ledges, work upon the removal of which was in progress at the beginning of the year. A new orange peel dipper dredge was completed early in the year and began work, the old clam-shell dredge was continued on the work, in order to prevent the discontinuance of the boat line which had been established on this river, and thereby largely nullifying the benefits of the money spent in the improvement of this river. Vigorous efforts were made to complete the provisional channel above the lock during the low-water season of 1907, in order to enable a landing to be made at Senate street, Columbia. The provisional channel had been almost completed to a width of 70 feet and depth of 4 feet, when operations were suspended about December 15. Due to continuous high water practically nothing was accomplished in rock excavation

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between December 15 and March 15. About the latter date rock removal was resumed, and on May 4 the steamer *City of Columbia* made the trip light to the foot of Senate street, and on May 24 landed at the foot of Senate street loaded for the first time. Since that date she has landed regularly at the foot of Senate street. The provisional channel 70 feet in width and 4 feet in depth is practically completed. Due to the state of the appropriation future work must be confined to widening this channel at its narrowest places, so as to provide a width of about 80 feet with somewhat increased width at the turn of the channel. The remaining funds must be held in hand to provide for necessary snagging and dredging. The present depth and width above the lock will, with some work of maintenance, enable the steamer to continue to land at the foot of Senate street.

During the year a total of approximately 4,039 tons of rock were removed from this provisional channel. The rock is granite, and all blasting has been done by hand drilling. Much difficulty has been experienced in this work. In the removal of rock to provide a navigable channel experience herein shows that drilling for blasting should be carried for a distance of 3 or 4 feet below the projected navigable depth; otherwise projections will be left which requires subsequent tedious hand drilling to remove, and with living rock close to the supposed navigable depth there is always danger of small rock being rolled down upon this living rock and creating a dangerous obstruction.

Money statement.

July 1, 1907, balance unexpended		$63,745.24
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$29,072.67	
For maintenance of improvement	8,185.24	
		37,257.91
July 1, 1908, balance unexpended		26,487.33
July 1, 1908, outstanding liabilities		2,070.73
July 1, 1908, balance available		24,416.60
July 1, 1908, amount covered by uncompleted contracts		8,883.33
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908		20,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897.		

APPROPRIATIONS.

August 5, 1886	$7,500.00	March 2, 1907 (allotment)	$67,000.00
August 11, 1888	7,500.00		
September 19, 1890	5,000.00	Total appropriations	128,000.00
July 13, 1892	5,000.00	Refunded on account of overpayment	.50
August 18, 1894	4,000.00		
June 3, 1896	2,000.00	Total	128,000.50
June 13, 1902 (allotment)	5,000.00		
March 3, 1905 (allotment)	25,000.00		

CONTRACT IN FORCE.

For contract in force, see Great Pedee River (Congaree portion $8,883.33.)

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COMMERCIAL STATISTICS, 1907.

Article.	Quantity.	Value.
Outward freights:	*Tons.*	
Cotton and cotton-seed meal	1,150	$60,500
Timber	67,200	672,000
Miscellaneous general merchandise	983	51,950
Total	69,333	784,450
Inward freights: Miscellaneous general merchandise	4,500	450,000
Grand total	73,833	1,234,450

N 7.

OPERATING AND CARE OF LOCK AND DAM ACROSS CONGAREE RIVER NEAR COLUMBIA, SOUTH CAROLINA.

An overseer and four laborers were maintained as a permanent force for the purpose of operating the dam and lock. During the year repairs were made as required to the trestles, aprons, and wickets, and after the long winter freshet considerable dredging was done to remove sand and stones from the lock chamber. Minor repairs were made to the lock keeper's dwelling.

After May 4, 1908, the lock was operated for the regular trips of the steamer *City of Columbia*, and for other boats as required during the year.

The expenditures during the fiscal year were as follows:

Services:		
Administration and superintendence		$1,234.03
Watchmen and laborers (care of lock)		2,600.58
Repairs to plant and property		73.38
Riprapping bank		524.81
Total		4,432.80
Materials:		
Office expenses	$74.94	
Supplies	116.26	
Repairs to dwelling	208.57	
Repairs to aprons, trestles, etc	232.38	
Fuel, etc., for dredging sand	133.01	
Riprapping bank	105.55	
		870.71
Grand total		5,303.51

N 8.

IMPROVEMENT OF INLAND WATERWAYS BETWEEN CHARLESTON, SOUTH CAROLINA, AND OPPOSITE McCLELLANVILLE.

At the end of the last fiscal year the Simons-Mayrant Company had dredged through Hamlin Creek, and in doing this had removed a total of 57,363 cubic yards of material. Dredging was continued by this firm in Grays Bay, which was completed in July. The necessary dredging was done in Bullyard Sound and Santee Pass by the same company, after which their contract was closed, and the balance available for this work was too small to warrant beginning the next

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stretch. To have begun without completing it, the channel from Prices Creek to Van Ross Creek would not have been helpful to navigation, and would probably have resulted in total loss to the Government. The small balance was carried on to the next contract. The total amount dredged by this company during the year was 101,078 cubic yards, and the total dredged under their contract was 158,441 cubic yards.

On September 13, 1907, contract was entered into with the Savannah Dredging Company, to dredge from Van Ross Creek to McClellanville, or so far as the funds available would permit. The price secured after advertising for bids twice was 23⅝ cents, which was rather larger than had been hoped for, but in consideration of the isolated situation and other difficulties attending the work, it was deemed best to enter into contract with them at that price. The plant of the Savannah Dredging Company arrived at Van Ross Creek near the end of November. The work progressed very slowly at first, but later proceeded more satisfactorily. The plant used is a good one, the main delay being due to the difficulty of moving the pipe line forward over the soft marshes through which the cuts run. The total amount of dredging by this company to June 30, 1908, was 183,857 cubic yards. At the end of June they had completed the cut from Belvedere to Saltpond Creek and had begun work in the latter creek. It is expected that the amount available will complete the necessary dredging to Grahams Creek, from which point to McClellanville there is now a channel which, although insufficient, can be used at or near high water. If the dredging can be completed to Grahams Creek the work done will accomplish one of the objects of the improvement, namely the avoidance of Bulls Bay, which is shallow and difficult of navigation and sometimes dangerous.

The total amount of the estimate for this improvement has been appropriated, but after the opening of the bids in August, 1907, it became apparent that the work projected could not be completed for the estimated amount, $125,290. The reason for this discrepancy between the estimate and the actual cost is that the unit price for dredging this route has proved to be more than twice that of the original estimate, and although a change of route by the act of Congress making the last appropriation has greatly reduced the quantity to be removed, the amount of the estimate is insufficient by about $66,000. Authority was consequently requested and granted by the Chief of Engineers to increase the estimate to $191,290. With the additional amount it is expected that the channel from Grahams Creek to McClellanville can be completed and also the incompleted portions between the work of the Simons-Mayrant Company and that of the Savannah Dredging Company.

Money statement.

July 1, 1907, balance unexpended	$107,441.12
June 30, 1908, amount expended during fiscal year for works of improvement	59,635.84
July 1, 1908, balance unexpended	47,805.28
July 1, 1908, outstanding liabilities	3,592.88
July 1, 1908, balance available	44,212.40

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July 1, 1908, amount covered by uncompleted contracts	$34,591.88
Amount (estimated) required for completion of existing project	66,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	66,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

Act of June 13, 1902	$50,000
Act of March 2, 1907	75,290
Total	125,290

CONTRACTS IN FORCE.

Name of contractor: Simons-Mayrant Company, Charleston, S. C.
For: Dredging.
Price: Twenty-one and four-tenths cents per cubic yard.
Date of contract: October 30, 1905.
Date of beginning: February 14, 1906.
Date of expiration: Indefinite; exhaustion of appropriation.

Name of contractor: Savannah Dredging Company, Savannah, Ga.
For: Dredging.
Price: Twenty-three and five-eighths cents per cubic yard.
Date of contract: September 13, 1907.
Date of beginning: November 22, 1907.
Date of expiration: October 22, 1908.

COMMERCIAL STATISTICS, 1907.

Articles.	Quantity.	Value.
Toward McClellanville:	*Tons.*	
Fertilizers	3,290	$71,000
Oysters in shell	5,250	12,600
Miscellaneous general merchandise	2,650	182,500
Total	11,190	266,100
Toward Charleston:		
Sea-island cotton	424	290,405
Short cotton	120	33,600
Cotton seed	1,178	22,360
Vegetables	373	73,600
Palms	60	900
Lumber	8,000	64,000
Turpentine	225	48,000
Resin	900	46,400
Clams	210	6,300
Oysters in shell	8,225	22,500
Canned goods	200	20,000
Cord wood	5,000	8,200
Beef, mutton, fish, and game	125	19,220
Total	25,040	655,575
Grand total, both ways	36,230	921,675

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N 9.

IMPROVEMENT OF HARBOR AT CHARLESTON, SOUTH CAROLINA.

The U. S. dredge *Gen. Abbot*, which was reported at the end of the last fiscal year as being engaged on the Mississippi River under the United States engineer office at New Orleans, La., has remained under the jurisdiction of that office during the whole of the past year. The name of this dredge has been changed to *Sumter*, in compliance with instructions contained in Circular No. 1, Office Chief of Engineers, current series.

The U. S. dredge *Charleston*, which also belongs to the Charleston Harbor work, has been engaged during the year in dredging under the Mobile, Ala., engineer office.

The U. S. dredge *Winyah Bay* was ordered to Charleston to remove a portion of the shoal at the end of the jetties which had approached too near the channel, as was stated in annual report for 1907. This dredge arrived in Charleston on November 11, 1907, and remained until February 25, 1908, at which date it was returned to the Winyah Bay work. This vessel removed 100,600 cubic yards from the shoal alluded to, and 47,680 cubic yards from the inner shoal near the junction of the Fort Sumter range and the Mount Pleasant range. At the end of the year this dredge was repairing at Savannah, Ga. A portion of the cost of these repairs will be charged to the Charleston Harbor appropriation. The expenditures during the year were $8,713.18, divided as follows:

Dredge *Winyah Bay:*	
Pay roll	$3,368.83
Fuel for dredge	2,044.32
Water for dredge	17.59
Subsistence supplies	670.10
Engine-room supplies	236.16
Ship's supplies	68.00
Renewal of or addition to outfit	49.64
Ordinary repairs	434.36
Laundry, ice, miscellaneous, etc	90.19
Total	6,979.19
General expenses:	
Superintendence and surveys	1,637.40
Office expenses	78.63
Miscellaneous (care of property, etc.)	17.96
Total	1,733.99

The survey for the readjustment of the harbor lines of Charleston was continued at intervals during the year and the field work practically completed. It had been found that the measurement of the base used in the construction of the jetties differed somewhat from data furnished the United States Coast and Geodetic Survey, and advantage was taken of an opportunity during the year to measure another base with a 300-foot steel tape on Morris Island, Charleston Harbor, South Carolina. The coordinates of points in Charleston and on the borders of the harbor were changed to the new measurement. This work has been completed.

At the close of dredging operations in February a survey was made and another made in June. By the June survey the channel beyond the jetties shows slightly narrower than it was last year and the

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soundings in the channel are somewhat shoaler. In order to compare the present channel with that of two years ago, an area 600 feet by 1,500 feet in the most unfavorable portion of the channel was selected. Comparisons of the soundings within this area show an average shoaling of about 8 inches in the two years. The channel between the jetties is generally wider, but at the narrowest place, which is near No. 8 buoy, there is no change from last year. Here for a length of channel of about 500 feet the width is less than 600 feet and at the narrowest place about 550 feet. As no dredging has been done on the outer portion of the improved channel for nearly two years and only slight shoaling has taken place, the conclusion may very properly be drawn that the cost of maintenance for this part of the improved channel will be small. The inner portion of the channel shows practically the same depths as heretofore. The increase in width is mainly due to dredging along the north side. It seems not improbable that the channel between the jetties may be self-maintaining for many years. The estimate formerly made for maintenance was $25,000 every two years. The above facts indicate that this estimate is sufficient.

A good channel exists not less than 26 feet deep at mean low water and at least 600 feet wide throughout the improved portion, except for 500 feet, where the minimum width is about 550 feet. The shoal reported last year near the end of the jetties has been satisfactorily removed by the dredge *Winyah Bay*.

Money statement.

July 1, 1907, balance unexpended	$25,688.12
Received since, account sales	337.93
	26,026.05
June 30, 1908, amount expended during fiscal year for maintenance of improvement	8,713.18
July 1, 1908, balance unexpended	17,312.87
July 1, 1908, outstanding liabilities	308.36
July 1, 1908, balance available	17,004.51
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	25,000.00

APPROPRIATIONS.

June 18, 1878	$200,000.00	June 28, 1902	$50,000.00
March 3, 1879	200,000.00	March 3, 1903	60,000.00
June 14, 1880	170,000.00	April 28, 1904	73,000.00
March 3, 1881	175,000.00	March 3, 1905	25,000.00
August 2, 1882	300,000.00	March 3, 1905	25,000.00
July 5, 1884	250,000.00	March 2, 1907	25,000.00
August 5, 1886	187,500.00		
August 11, 1888	350,000.00	Total appropriations	4,650,500.00
September 19, 1890	370,000.00		
July 13, 1892	225,000.00	Received for rent of dredge, account sales at auction, and account overpayments	7,823.23
March 3, 1893	750,000.00		
August 18, 1894	450,000.00		
March 2, 1895	500,000.00		
June 6, 1900	220,000.00		
June 13, 1902	45,000.00	Total receipts	4,658,323.23

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COMMERCIAL STATISTICS.

Statement of vessels entered and cleared (foreign trade).

Number.	Arrived.		Cleared.	
	Tonnage.	Crew.	Tonnage.	Crew.
128	174,219	3,040	.....	.....
60	.....	.....	40,851	1,234

Value of imports	$3,810,280.00
Value of exports	2,226,586.00
Duties collected	53,796.84

Commerce through Charleston Harbor, ocean entrance, calendar year 1907.

Articles.	Tons of 2,000 pounds.	Value.	Articles.	Tons of 2,000 pounds.	Value.
IMPORTS.			EXPORTS.		
Sulphate of lime	341	$1,023	Lumber and cross-ties	109,630	$1,427,572
Muriate of potash	9,065	355,716	Manipulated fertilizers	9,362	321,517
Kainit	59,369	469,503	Acid phosphate	100	600
Nitrate of soda	20,192	992,316	Clay	21,424	117,832
Sulphate of ammonia	2,629	162,920	Cotton, upland	39,432	8,675,029
Sulphate potash	1,338	60,888	Cotton, sea-island	2,017	1,392,551
Manure salts	4,820	73,402	Oysters	709	70,900
Pyrites	68,398	339,139	Cotton goods	63,279	25,311,600
Guano	5,217	151,092	Cotton factory sweepings and lint	1,695	135,600
Tankage	102	3,633	Cotton-seed cake and oil	5,348	389,264
Fish scrap	9,909	231,615	Rice	718	71,814
Fertilizer material	3,070	77,649	Naval stores	1,838	133,031
Lime, cement, and plaster	26,392	263,925	Miscellaneous	5,760	576,000
Jute butts	6,822	401,934			
Burlaps	1,433	21,495			
Refined oil and gasoline	9,968	390,342			
Coal	81,894	239,222			
Salt	3,323	23,334			
Rice	4,123	24,738			
Cotton (Egyptian)	468	74,400			
Fruit	12,389	320,249			
Coffee	232	92,800			
Refined sugar	5,717	571,700			
Miscellaneous	123,765	12,171,599			
Total	460,976	17,515,134	Total	261,362	38,623,310

Total imports and exports, 722,338 tons, valued at $56,138,444.

These commercial statistics do not include a large part of the business of Charleston which is done by the railroads, nor the commerce passing over the rivers which enter the harbor, nor over the inland routes to the north and south.

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APPENDIX O.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SAVANNAH, GEORGIA, DISTRICT.

REPORT OF COL. DAN C. KINGMAN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Savannah Harbor, Georgia.
2. Savannah River below Augusta, Georgia.
3. Savannah River above Augusta, Georgia.
4. Harbor at Darien and Doboy Bar, Georgia.
5. Altamaha, Oconee, and Ocmulgee rivers, Georgia.
6. Club and Plantation creeks, Georgia.
7. Brunswick Harbor, Georgia.
8. Inside water route between Savannah, Georgia, and Fernandina, Florida.
9. Skidaway Narrows, Georgia.
10. Cumberland Sound, Georgia and Florida.
11. Fernandina Harbor, Florida.
12. Removing sunken vessels or craft obstructing or endangering navigation—Indefinite.

UNITED STATES ENGINEER OFFICE,
Savannah, Ga., July 18, 1908.

SIR: I have the honor to transmit herewith my annual report for the fiscal year ending June 30, 1908, upon the works of river and harbor improvements in my charge.

Very respectfully, your obedient servant,

DAN C. KINGMAN,
Colonel, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

O 1.

IMPROVEMENT OF SAVANNAH HARBOR, GEORGIA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

For a detailed history of the work, see Reports of the Chief of Engineers for 1903, pages 1146–1152; for 1904, pages 1644–1647; for 1905, pages 1260–1262; for 1906, pages 1187–1190, and for 1907, pages 1272–1274.

The existing project for the improvement of Savannah Harbor is tentative, and has for its object to ascertain how deep a channel, within limits, can be secured and maintained by dredging alone at

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moderate cost, upon the ocean bar, and it is proposed at the same time to carry up the river, to the city of Savannah, the increased depth gained on the bar in order that commerce may have the immediate benefit of the work done. The Savannah River, from the city to the sea, is a tidal estuary, from 1 to 3 miles wide, divided and subdivided by chains of islands, and receiving at the upper end the discharge of a large fresh-water, silt-bearing river. The mean rise and fall of the tide in this estuary is a little less than 7 feet.

The improvement has been carried far enough already to secure a channel of 28 feet at mean high water, and a further increase in depth is desired. The improvement of the river has heretofore been effected by extensive dredging and by a system of control, which has for its object to confine the ebb tide flow to a single channel of such dimensions as the current can of itself maintain, and care is taken at the same time to preserve the tidal basins, permitting them to be filled by the flood tide, and to deliver their volumes on the ebb to the navigable channel after the manner of tributaries. This control has been obtained by the means of spur dikes and training walls. In the upper portion of the river, where the teredo is not troublesome, these structures consist of a double row of piling, with a filling of brush fascines weighted and held in place by stone. Near the mouth of the river the structures consist of rubble mounds, resting upon mattresses of fascines or logs.

The width of the improved channel opposite the city is about 600 feet, and this gradually increases to 1,800 feet at the mouth.

The islands, in many places, are utilized to diminish the length of training walls required.

The channel in plan presents long, easy bends, and hence the places where it is carried from one side of the river to the other are naturally critical points. There are three such places, and because the training walls were not built up to the height of mean high water, or because they have settled since, the control at these points of inflection is not perfect. At the higher stages of the ebb the water spills over the training walls and a considerable part of its volume escapes from the improved channel and is lost, whereby the current is diminished and deposit induced, to the injury of the channel.

Beyond the mouth of the river there is a considerable area, partially protected by submerged sand bars, and known as the Tybee Roads. The natural depth here is about 30 feet at mean high water. Beyond the roads there is an elevated rim, about 1 mile across, which forms the ocean bar. The greatest available depth upon it before the improvements were made was 26.5 feet at mean high water. The distance of this bar from the mouth of the river is about 7 miles.

It is evident that no deepening of the river beyond that carried on upon the bar would be useful to navigation, so that it was a vital question whether the depth on the bar could be permanently increased by dredging, or whether it would be necessary to supplement this work by the construction of jetties, which would, in any case, be very expensive. In the past two and one-half years there has been dredged from the bar, in round numbers, about 770,000 cubic yards of material, measured in the bins of dredges, and the last survey, compared with the conditions existing before dredging, indicates that about 600,000 cubic yards, place measurement, has been

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removed. The difference between these two may be partially explained by the natural growth of excavated material in the bins, and also by unavoidable errors in surveys in such exposed localities, and, for the rest, by the deposit which may have taken place during the entire period. There is a difference of 170,000 cubic yards of material to be accounted for. If it is all deposit, it would be at a rate of a little less than 70,000 cubic yards a year, which amount is not alarming, and which it would not be expensive to remove. Whether this apparent deposit will continue as the work progresses, or will increase or diminish, will be shown by the surveys which will be had from time to time.

Within the river but little has been done during the year with a view to securing an increase in depth. The work accomplished has had for its object to maintain the depth of the old project and it has been necessary to remove material at all three of the points of inflection heretofore described, and in the following amounts, viz, at the Upper Flats, 81,000 cubic yards; at the Lower Flats, 85,000 cubic yards, and at Long Island Crossing, 166,000 cubic yards. But the net result shows a rather more ample channel than at the beginning of the year, so that the total deposit at these three places has been less than the amount dredged.

To bring the river more completely under control, the training walls at these points of inflection are being raised to mean high water. The work so far accomplished has tended to accelerate the ebb-tide flow at these points, and it is possible that some scour has resulted. This, however, is not the object sought. The purpose of the work is simply to maintain a flow of such regularity and velocity that no deposit will occur.

This, in brief, is a statement of the experiment so far as it has gone, and the result is distinctly encouraging. The actual operations during the year have been as follows:

The two U. S. seagoing dredges *Savannah* and *Cumberland* have been employed throughout the year in improving and maintaining the harbor of Savannah, except when they were necessarily undergoing repairs, and except for about two months when the dredge *Cumberland* was employed in Cumberland Sound. The two machines together dredged a total of 1,143,811 cubic yards of material, measured in their bins, of which the *Savannah* removed 541,347 cubic yards, at a total cost, including all repairs, of 10.8 cents per cubic yard, and the *Cumberland* removed 602,464 cubic yards, at a total cost, including all repairs, of 8.5 cents per cubic yard.

Of this material, 388,363 cubic yards was dredged from the outer bar, enlarging the channel to a width of not less than 325 feet, and a depth of not less than 30 feet at mean high water. The channel diminishes in depth toward the side ranges. For a width of 150 feet it has a minimum depth of 32 feet, and for a width of 225 feet, a minimum depth of 31 feet. All depths refer to mean high water. The mean rise and fall of the tide on the bar is 7 feet.

These dredges removed from Tybee knoll 384,686 cubic yards of material, mostly from between the jetties. The result of this has been to greatly increase the capacity of the channel between the jetties, though no effort has yet been made to increase the depth beyond 28 feet. Work on the knoll was carried on in conjunction with that

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on the outer bar, a load being taken by each dredge from the knoll on their way out to the bar each morning. When weather conditions prevented work on the bar, but still did not prevent the dredges crossing the bar with a load going to the dump grounds, dredging was carried on in the knoll channel. At such times as it was too rough to work either on the knoll or the bar, the dredges were employed in maintaining the old project depth of 28 feet at mean high water at all shoal places in the inner harbor. From the harbor above Tybee knoll there were removed a total of 370,762 cubic yards of material, nearly all of which was dumped in the basin of deposit opposite the Venus Point mooring dolphin.

Under agreement of March 15, 1907, with the Savannah Dredging Company, a small 12-inch stationary pumping dredge was employed during the months of July, August, September, and October, 1907, in rehandling material at the Venus Point dolphin, a total of 116,695 cubic yards of material being handled. After the termination of this agreement several efforts were made to obtain another rehandling machine, but without success.

A contract was entered into on July 31, 1907, with D. Power & Co., of Savannah, Ga., for carrying out certain work of raising training walls at critical points provided for in the project. Work was begun on August 14, 1907, and up to the close of the fiscal year the following quantities of material had been placed in the work, viz, 1,970 piles, 9,000 feet B. M. of timber; 49,689.9 cubic yards of brush fascines, and 23,948.12 tons of stone. Forty bent over and broken piles were removed. This work was done upon the Mackay Point, South channel, North Elba Island, Lower Flats, Venus Point, and North Long Island training walls, Dams Nos. 14, 23, and 33, and Big and Little Gap dams. The object of this work is to raise existing training walls and spur dikes to the level of high-water mark, in order to more completely control the ebb-tide flow of the river. The effect of the work which has thus far been done has been satisfactory.

On November 23, 1907, the Secretary of War allotted the sum of $8,000 from the emergency appropriation provided for in the river and harbor act of March 3, 1905, to be applied to the restoration of channel depths in the steamboat channel between Savannah, Ga., and Beaufort, S. C. This work included dredging in Ramshorn Creek and in Mud River Cut. An emergency contract was entered into on February 18, 1908, with Simons-Mayrant Company, of Charleston, S. C., at 23 cents per cubic yard, place measurement. Work began March 16 and was suspended May 25, 1908, upon the completion of the dredging in Ramshorn Creek, a total of 31,154 cubic yards being removed. The dredging found to be necessary in this creek exceeded the estimate, so that the balance of funds remaining was insufficient to accomplish the proposed dredging in the Mud River Cut. An additional allotment of $1,000 was procured. Supplemental articles of agreement were entered into June 15, 1908, with the same contractors, waiving the date set for completion of the original contract, viz, June 16, 1908, and providing for the removal of not to exceed 6,000 cubic yards of material from the Mud River Cut. Under the terms of this supplemental agreement the contractors are to begin work as soon as they finish certain other work for the United States at Screvens Ferry, through the Fig Island jetty.

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On May 26, 1908, an emergency contract was entered into with Simons-Mayrant Company, of Charleston, S. C., for the restoration of the channel into Back River, through the cut in Fig Island jetty, at what is known as Screvens Ferry. Work was begun May 26 and completed July 6, a total of 16,816 cubic yards of material being removed.

A new engine and boiler were purchased and installed in the steamer *Angler*, and the boat hauled out on marine railway and extensive repairs made to her hull.

The hydraulic dredge *Morgan*, built for this harbor by the Ellicott Machine Company, Baltimore, Md., under the supervision of Maj. J. C. Sanford, Corps of Engineers, was delivered at Savannah by the contractors on June 12, 1908. As this was about forty days in advance of the contract requirement, the necessary outfit, ponton lines, etc., had not been obtained, and at the close of the fiscal year it had not been practicable to place the dredge in commission. At the close of the year work upon the ponton line and the necessary coal and water and derrick barges was progressing satisfactorily, and it is hoped that the dredge will be in condition to commence the rehandling of material at the Venus Point mooring dolphin during the early part of August. A thirty-days' test under working conditions remains to be made before the final acceptance of the machine.

The tide-gauge observations have been maintained throughout the year and show no important change from previous conditions.

In addition to the work herein described, the plant pertaining to the improvement has been cared for and properly maintained.

Of the total amount expended during the fiscal year, viz, $214,548.96, the sum of $51,337.48 was for dredging with the U. S. dredge *Cumberland*, at 8.5 cents per cubic yard, including cost of repairs; $58,840.60 for dredging with the U. S. dredge *Savannah*, at 10.8 cents per cubic yard, including repairs; $16,365.75 for rehandling dredged material under agreement of March 15, 1907, with Savannah Dredging Company, at $6.50 per hour of pumping, including cost of board for inspectors; $132 for superintending work under agreement with Savannah Dredging Company; $6,463.87 for dredging in inland waterway between Savannah, Ga., and Beaufort, S. C., under emergency contract of February 18, 1908, with Simons-Mayrant Company, at 23 cents per cubic yard; $65,782.60 for jetty work under contract of July 31, 1907, with D. Power & Co., at $2.25 per ton for stone, 51 cents per cubic yard for brush fascines, $5.25 each for piling, and $40 per M feet B. M. for timber; $3,514.88 for new engine and boiler and repairs to hull of steamer *Angler*, and $12,111.78 for surveys and contingencies.

COMMERCE AND NAVIGATION.

Full discussions of the commerce of Savannah were given in the Reports of the Chief of Engineers for 1890, pages 1252 and 1253, and for 1897, page 1497.

The regular lines of steamships established between this port and New York, Boston, Baltimore, and Philadelphia comprise a total of 16 steamers. During the calendar year 1907, 9 of these ran to the two first-named ports and 7 to the last-named two. During the year

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they made 526 round trips and carried 1,090,403 tons of freight, valued at $130,847,960. They also handled in and out of Savannah 35,312 passengers.

On the inland waters there are a number of small steamers plying between Savannah and adjacent ports, besides numerous schooners and small sailboats. It is estimated that for the year 1907 this portion of the commerce amounted to 100,000 tons, valued at $1,500,000.

The chief articles of export are cotton, lumber, and naval stores, of which shipments for the year 1907 were as follows: Of cotton, 1,467,474 bales; of lumber, 225,108,166 feet, and of naval stores, 187,251 barrels of turpentine and 697,341 barrels of rosin.

The total amount of freight received and shipped at the port during 1907 was 3,885,434 tons, valued at $209,018,494. This is an increase over 1906 of 84,385 tons.

Money statement.

July 1, 1907, balance unexpended		$269,257.59
Amount received from proceeds of sale of Government property		36.90
Amount allotted from emergency appropriation		9,000.00
Amount appropriated by sundry civil act approved May 27, 1908		300,000.00
		578,294.49
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$148,036.91	
For maintenance of improvement	66,512.05	
		214,548.96
July 1, 1908, balance unexpended		363,745.53
July 1, 1908, outstanding liabilities		46,479.08
July 1, 1908, balance available		317,266.45
July 1, 1908, amount covered by uncompleted contracts		28,862.38
Amount (estimated) required for completion of existing project		400,009.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908		400,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897.		

AMOUNT AND DATE OF ALL APPROPRIATIONS.

From 1826 up to the date of the 22-foot plan of improvement appropriations amounting to $667,096.64 were made for the improvement of the harbor and for the removal of wrecks, as follows:

March 18, 1826	$50,000.00
March 3, 1829	24,490.00
July 3, 1832	25,000.00
March 2, 1833	43.06
March 2, 1833	8,430.62
June 28, 1834	30,000.00
March 3, 1835	20,000.00
July 7, 1838	15,000.00
August 30, 1852	40,000.00
March 3, 1855	161,000.00

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June 10, 1872	$50,000.00
March 3, 1873	50,000.00
February 27, 1874	193,132.96
Total	667,096.64

Under the 22-foot plan of improvement the following appropriations were made:

June 23, 1874	$50,000.00
March 3, 1875	70,000.00
August 14, 1876	62,000.00
June 18, 1878	70,000.00
March 1, 1879	100,000.00
June 14, 1880	65,000.00
March 3, 1881	65,000.00
August 2, 1882	200,000.00
July 5, 1884	200,000.00
August 5, 1886	150,000.00
August 11, 1888	180,000.00
	1,212,000.00
Unexpended balance of last appropriation carried to new project	4,035.05
Total	1,207,964.95

Under the 26-foot plan of improvement the following appropriations have been made:

By act of Congress of—	
August 11, 1888 (unexpended balance)	$4,035.05
September 19, 1890	350,000.00
July 13, 1892	318,750.00
March 3, 1893	1,000,000.00
August 18, 1894	975,000.00
March 2, 1895	856,250.00
	3,504,035.05
Amount deposited by clerk of United States circuit court for the southern district of Georgia, March 20, 1895	500.00
Unexpended balance of last appropriation carried to modified project	44,485.06
Total	3,460,049.99

Under the modified 26-foot project for improving Savannah Harbor the following appropriations have been made:

By act of Congress of—		
March 2, 1895 (unexpended balance)		$44,485.06
June 3, 1896		5,000.00
June 4, 1897		350,000.00
July 1, 1898		450,000.00
March 3, 1899 (sundry civil act)	$200,000.00	
March 3, 1899 (river and harbor act)	50,000.00	
		250,000.00
June 13, 1902		50,000.00
		1,149,485.06
Amount deposited to credit of the appropriation		301.41
Total		1,149,786.47
Unexpended balance of last appropriation carried to new project		436,867.63
Total		712,918.84

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Under the 28-foot plan of improvement the following appropriations have been made:

By act of Congress of—		
June 13, 1902 (unexpended balance from last appropriation)		$436,867.63
March 3, 1903		720,000.00
June 6, 1900 (allotted August 28, 1903, from emergency appropriation)		5,000.00
April 28, 1904		105,000.00
March 3, 1905 (river and harbor act)	$75,000.00	
March 3, 1905 (sundry civil act)	175,000.00	
		250,000.00
September 28, 1905 (allotted from emergency appropriation)		10,000.00
June 30, 1906 (sundry civil act)		150,000.00
March 4, 1907 (sundry civil act)		60,000.00
Total		1,736,867.63
Unexpended balance of last appropriation carried to new project		94,257.59
Total		1,642,610.04

Under the tentative plan of improvement, adopted March 2, 1907, the following appropriations have been made:

By act of Congress of—		
March 4, 1907 (unexpended balance from last appropriation)		$94,257.59
March 2, 1907 (river and harbor act)		300,000.00
March 3, 1905 (allotted November 23, 1907, from emergency appropriation)		8,000.00
March 3, 1905 (allotted June 6, 1908, from emergency appropriation)		1,000.00
May 27, 1908 (sundry civil act)		300,000.00
Total		703,257.59
Amounts received from proceeds of sales of Government property and blueprints		717.15
Total		703,974.74
Grand total		8,394,615.20

CONTRACTS IN FORCE.

Name and address of contractor: D. Power & Co., Savannah, Ga.

Character and amount of work: Repairing, raising, and extending training walls and spur dams—Stone, 30,000 tons; brush fascines, 50,000 cubic yards; piling, 2,200; timber, 6,500 feet B. M.

Rate (in place): Stone, $2.25 per ton; brush fascines, 51 cents per cubic yard; piling, $5.25 each; timber, $40 per M feet B. M.

Date of approval: August 7, 1907.

Work begun: August 14, 1907.

Expires: June 10, 1908 (waived; no specific date fixed).

Name and address of contractor: Simons-Mayrant Company, Charleston, S. C.

Character and amount of work: Dredging in inland waterway between Savannah, Ga., and Beaufort, S. C., 36,100 cubic yards.

Rate: 23 cents per cubic yard, place measurement.

Date of approval: (Emergency; no approval required).

Work begun: March 16, 1908.

Expires: June 16, 1908 (waived by supplemental agreement dated June 15, 1908, approved by Chief of Engineers June 26, 1908, and by Secretary of War June 29, 1908, which also provides for additional dredging, to be completed about August 6, 1908).

Name and address of contractor: Simons-Mayrant Company, Charleston, S. C.

Character and amount of work: Dredging Screven's Ferry—Fig Island Cut, 24,000 cubic yards.

Rate: 15 cents per cubic yard, place measurement.

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Date of approval: (Emergency; no approval required).
Work begun: May 29, 1908.
Expires: Sixty days after date of commencement.
Completed July 6, 1908.
Name and address of contractor: Merrill-Stevens Company, Jacksonville, Fla.
Character of work: Docking and repairing U. S. seagoing dredge *Cumberland*.
Amount of contract: $21,529.70.
Date of approval: (Emergency; no approval required).
Work begun: (Not begun at close of fiscal year).
Expires: October 2, 1908.

COMMERCIAL STATISTICS.

Cotton statistics of the port of Savannah, Ga., for the commercial year ending August 31, 1907, are as follows:

Receipts from all sources.

Grade.	Quantity.	Weight.	Value.
	Bales.	*Pounds.*	
Upland	1,434,931	725,798,099	$75,376,925
Sea-island	34,288	13,346,947	4,107,702
Total	1,469,219	739,145,046	79,484,627

Destination.	Upland.	Sea-island.
	Bales.	*Bales.*
Coastwise	519,594	20,953
Great Britain	158,246	8,514
France	48,440	2,426
Other continental ports	709,105	196
Local consumption	2,253	.....
Reshipped to interior	5,350	2,713
Total	1,442,988	34,802

Total exports.

Grade.	Foreign exports.	Coastwise exports.	Total.
	Bales.	*Bales.*	*Bales.*
Upland	915,791	519,594	1,435,385
Sea-island	11,136	20,953	32,089
Total	926,927	540,547	1,467,474

Total cotton receipts and exports at Savannah, season of 1906–7.

Receipts	bales..	1,469,219
Exports	do....	1,467,474

Total receipts and exports of naval stores at the port of Savannah, season of 1907–8.

Spirits of turpentine:		
Receipts	casks..	205,068
Exports	do....	187,251
Rosin:		
Receipts	barrels..	720,095
Exports	do....	697,341

Total exports of lumber from Savannah for season of 1906–7.

Superficial feet..... 225,108,166

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Arrivals and clearances of vessels and commerce at Savannah, Ga., from January 1 to December 31, 1907.

[Does not include coastwise sailing vessels which are not required to enter and clear at the custom-house.]

	Arrived.			Cleared.		
	Number.	Tonnage.	Crew.	Number.	Tonnage.	Crew.
Coastwise	661	1,495,546	27,554	561	1,251,913	24,665
Foreign ports:						
American vessels	11	5,040	112			
Foreign vessels	106	217,093	2,841	204	452,829	5,712
Total	778	1,717,679	30,507	765	1,704,742	30,377

Greatest draft:	Ft.	in.
Arrived	24	6
Cleared	26	6

Commerce (foreign).

Value of exports	$64,366,503
Value of imports	1,856,438
Duties collected	63,893

O 2.

IMPROVEMENT OF SAVANNAH RIVER, GEORGIA, BELOW AUGUSTA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Between August 8 and December 30, 1907, and between May 20 and June 30, 1908, 1,698 snags and 237 stumps were removed from the channel and 3,811 overhanging trees and 66 logs were cut on the banks of the stream. Forty feet of the upper spur dam at Sand Bar Ferry and 100 feet of a temporary dike at Tweedy's bar were removed, which work was made necessary by the shifting of the channel at these points, due to freshets. The training wall on the Georgia side of the river at Tweedy's bar, constructed during the last fiscal year, was repaired by the addition of 300 cubic yards of brush fascines, sufficient rock to hold the brush in place being taken from abandoned spur dams in the vicinity. Several sand bars were greatly improved by the dragging of heavy anchors over them by the snag boat *Tugaloo*. Twenty-five feet of a projecting point of bank at Tweedy's bar was removed by blasting. The snag boat *Tugaloo* was hauled out on marine railway and put in thorough repair

Of the amount expended during the fiscal year, viz, $11,879.36, the sum of $9,907.90 was for snagging operations with the U. S. snag boat *Tugaloo* and $1,971.46 for care of plant, office expenses, and contingencies.

The last appropriation under the estimate of 1890 was made by act of June 28, 1902. In 1903 the district officer reported that the project was still uncompleted and submitted an additional estimate of $75,000 as being necessary to carry the work to completion in addition to the annual cost of maintenance. Since this estimate was submitted, an allotment of $5,000 has been made from the emergency act of April 28, 1904, and an allotment of $2,000 from the emergency act of March 3, 1905, and the sum of $43,000 appropriated by the river and harbor acts of March 3, 1905, and March 2, 1907, but owing to provision for maintenance work a further sum of $50,000, in addition

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to annual cost of maintenance, will be required to carry the project to completion.

A new project for the satisfactory improvement of the river for 30 miles below Augusta, based upon a survey called for by the river and harbor act of March 2, 1907, will be found printed as House Executive Document No. 962, Sixtieth Congress, first session. In the event this project is adopted by Congress, the above estimate of $50,000 would necessarily be changed.

COMMERCE AND NAVIGATION.

A detailed statement of the sources of the commerce of this river is given on page 1331 of the Annual Report of the Chief of Engineers for 1890 and on page 1504 of the report for 1897.

During the calendar year 1907 there were 4 steamers engaged in river traffic between Savannah and Augusta, which carried a total of 60,980 tons of freight, valued at $6,722,000. There were also transported to Savannah from points on the river 2,033 tons of rice, valued at $74,530. The total commerce for the year amounted to 63,013 tons, valued at $6,796,530.

During the same year it is estimated that about 15,000,000 feet B. M. of timber was rafted down the river, valued at $150,000. Complete information concerning this portion of the commerce could not be obtained.

Money statement.

July 1, 1907, balance unexpended		$29,384.12
June 30, 1908, amount expended during fiscal year for maintenance of improvement		11,879.36
July 1, 1908, balance unexpended		17,504.76
July 1, 1908, outstanding liabilities		1,037.89
July 1, 1908, balance available		16,466.87
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$50,000.00	
For maintenance of improvement	4,000.00	
		54,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

AMOUNT AND DATE OF ALL APPROPRIATIONS.

Under the original project for improvement of the Savannah River, adopted in 1880, the following appropriations were made:

By act of Congress of—	
March 3, 1881	$15,000.00
August 2, 1882	25,000.00
July 5, 1884	15,000.00
August 5, 1886	15,000.00
August 11, 1888	21,000.00
	91,000.00
Unexpended balance from last appropriation, carried to new project	19.91
Total	90,980.09
Received from other appropriations for use of snag boat	2,500.00
Total	93,480.09

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Since the existing project for improving the Savannah River was adopted the following appropriations have been made for this work:

By act of Congress of—	
August 11, 1888 (balance unexpended)	$19.91
September 19, 1890	25,000.00
July 13, 1892	35,000.00
August 18, 1894	15,000.00
June 3, 1896	15,000.00
March 3, 1899	20,000.00
June 6, 1900	64,000.00
March 3, 1901	100,000.00
June 28, 1902	86,000.00
April 28, 1904 (allotted November 11, 1904, from emergency appropriation)	5,000.00
March 3, 1905	13,000.00
March 3, 1905 (allotted November 24, 1906, from emergency appropriation)	2,000.00
March 2, 1907 (river and harbor act)	30,000.00
Total	410,019.91
Amount received from "Proceeds of sale of Government property" November 12, 1902	50.00
Amount received from "Proceeds of sale of Government property" October 21, 1904	15.00
Amount received from "Proceeds of sale of Government property" February 17, 1905	590.77
Total	410,675.68
Grand total	504,155.77

O 3.

IMPROVEMENT OF SAVANNAH RIVER ABOVE AUGUSTA, GEORGIA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30 1908.

During the month of November, 1907, a working party removed from the channel at Bush Rock ledge 3 bowlders, weighing about 2 tons each; the channel at Stevens Creek Falls was deepened about 18 inches by the removal of a rock ledge, and at Big Rapid Gap a dam, about 40 feet long and 4½ feet high, was built to confine the flow at that point.

COMMERCE AND NAVIGATION.

A detailed statement of the commerce tributary to this river is given in a report on the examination and survey of the river, printed as House Executive Document No. 213, Fifty-first Congress, first session.

The freight carried on the river consists of cotton, hay, grain, fertilizers, cord wood, and general merchandise. In 1907 it amounted to 3,983 tons, valued at $122,028.

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Money statement.

July 1, 1907, balance unexpended	$3,000.00
June 30, 1908, amount expended during fiscal year, for works of improvement	289.17
July 1, 1908, balance unexpended	2,710.83
Amount (estimated) required for completion of existing project	8,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	3,000.00

AMOUNT AND DATE OF ALL APPROPRIATIONS.

Under the original project of improvement of Savannah River above Augusta, adopted in 1879, the following appropriations were made:

By act of Congress of—	
June 14, 1880	$16,000
March 3, 1881	8,000
August 2, 1882	15,000
Total	39,000

Since the existing project for improving this portion of Savannah River was adopted the following appropriations have been made for this work:

By act of Congress of—	
July 13, 1892	$10,000
August 18, 1894	6,000
June 3, 1896	3,000
March 3, 1899	1,000
March 3, 1905	2,000
March 2, 1907	3,000
Total	25,000
Grand total	64,000

O 4.

IMPROVEMENT OF HARBOR AT DARIEN, AND DOBOY BAR, GEORGIA.

Darien Harbor is constituted by that portion of Darien River between the town of Darien and Doboy Sound. Doboy bar constitutes the nearest ocean entrance to Darien Harbor and the Altamaha River. These two works were consolidated by the act of Congress approved June 13, 1902.

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OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

No work was done, no funds being available.

COMMERCE AND NAVIGATION.

The commerce of Darien consists almost entirely of lumber and timber. A daily steamer runs to Brunswick. There was rafted down the Altamaha River and its tributaries, to Darien, 93,900,000 feet of lumber and 2,750,000 feet was received from points on the inside waterway north and south of Darien.

The foreign and domestic shipments consisted of a total of 71,041,956 feet of lumber, valued at $1,022,612, and of this 67,133,541 feet was shipped from Sapelo, 13 miles north of Doboy bar, and 3,908,415 superficial feet, valued at $95,700, went over Doboy bar. The total amount rafted through Darien Harbor to Sapelo during the year was 61,000,000 feet and to Savannah 15,000,000 feet. There remained at the booms at the end of the calendar year about 9,000,000 feet.

The local freight handled at the port amounted to 1,500 tons, valued at $75,000.

Money statement.

Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement	$10,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

AMOUNT AND DATE OF ALL APPROPRIATIONS.

Previous to the existing project there was appropriated for Darien Harbor:

By act of Congress, June 18, 1878	$8,000.00

Since the existing project for improving this work was adopted the following appropriations have been made:

September 19, 1890	$25,000.00
July 13, 1892	25,000.00
August 18, 1894	25,000.00
June 3, 1896	20,000.00
March 3, 1899	10,000.00
From the appropriation of $30,000, Darien Harbor and Doboy bar, June 13, 1902, there was allotted November 7, 1902	24,000.00
Amount allotted November 23, 1904	26,865.96
Total	155,865.96
Amount received from appropriation for Cumberland Sound, Georgia and Florida	1,500.00
Amount received from refundment, July 31, 1906	.69
Total	157,366.65
Grand total	165,366.65

Previous to the existing project there was appropriated for Doboy bar:

By act of Congress, August 5, 1886	$5,795.40

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Since the existing project for this work was adopted the following appropriation was made:

March 3, 1899	$70,000.00
Unexpended balance carried to consolidated appropriation for improving harbor at Darien and Doboy bar	50,865.96
Total	19,134.04
Amount allotted December 23, 1903	2,000.00
Amount allotted November 23, 1904	28,000.00
Amount received from refundment	.10
Total	49,134.14
Grand total	54,929.54
Aggregate of appropriations for Darien Harbor and Doboy bar	220,296.19

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Darien, Ga., from January 1 to December 31, 1907.

	Arrived.			Cleared.		
	Number.	Tonnage.	Crew.	Number.	Tonnage.	Crew.
Coastwise	41	46,811	712	13	5,313	91
Foreign ports:						
American vessels						
Foreign vessels	7	11,190	143	39	59,984	858
Total	48	58,001	855	52	65,297	949

Timber shipments from port of Darien, Ga., from January 1 to December 31, 1907.

	Superficial feet.	Value.
Foreign	67,133,541	$926,912
Coastwise	3,908,415	95,700
Total	71,041,956	1,022,612

Commerce.

Value of exports and imports (coastwise and foreign)	$1,022,612
Value of local commerce	75,000
Value of lumber rafted through the port to Savannah, Ga	255,000
Total	1,352,612

O 5.

IMPROVEMENT OF ALTAMAHA, OCONEE, AND OCMULGEE RIVERS, GEORGIA.

(A) ALTAMAHA RIVER.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Four hundred and seventeen snags, 55 stumps, and 7 cubic yards of bowlder rock were removed from the channel, 448 overhanging trees and 1 log removed from the banks and 12 trees on the banks girdled. Fifteen hundred and seventy cubic yards of material was

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dredged in Beards Bluff Cut-off, 60 miles below The Forks, and 525 cubic yards of material dredged from the shoal at Piney Bluff, 20 miles below The Forks.

The combined hoister and pile driver *Sapelo* was repaired, a new Lidgerwood hoisting engine installed, and the plant fitted with boom swinging gear and a new Heyward bucket for dredging work.

The quarter boat *Skidaway* was constructed. This boat is of the tunnel-hull type, dimensions 55 by 12 feet, fitted with a 30-inch propeller and driven by a 30-horsepower Meitz and Weiss kerosene-oil engine. As this boat draws but 22 inches, it can navigate the rivers at the lowest stages of the water and can accommodate a working crew of 10 persons.

A new hull was constructed for the snag boat *Oconee* and the machinery and house transferred thereto from the old hull. Repairs were made to the boiler and machinery and all upper works.

Two small barges, each 50 by 12 feet, were constructed for use in transporting materials in connection with the construction and repair of training walls.

The cost of all of the work for the improvement of the plant was paid proportionately from the allotments for Altamaha, Oconee, and Ocmulgee rivers.

The construction of the quarter boat *Skidaway* was done under written proposal and written acceptance after circular letter; all other work stated above was by hired labor with the use of Government plant.

Of the amount expended during the fiscal year, viz, $9,186.83, the sum of $2,944.68 was for snagging, $1,249.63 for dredging, $3,990.93 for construction and repair of plant, and $1,001.59 for surveys and contingencies.

COMMERCE AND NAVIGATION

The principal items of commerce of the river are timber and naval stores and general merchandise.

During the calendar year 1907, 93,500,000 feet B. M. of timber were rafted down the river, valued at about $1,590,000. The majority of this timber came from the Oconee and Ocmulgee rivers, and was rafted down the Altamaha to mills at Darien and vicinity. About 18,950,000 feet originated on the Altamaha.

There were also handled 8,500 tons of freight, valued at $345,000.

Money statement.

July 1, 1907, balance unexpended		$19,826.15
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$3,143.32	
For maintenance of improvement	6,043.51	
		9,186.83
July 1, 1908, balance unexpended		10,639.32
Amount (estimated) required for completion of existing project		103,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$25,000.00	
For maintenance of improvement	4,000.00	
		29,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

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AMOUNT AND DATE OF ALL APPROPRIATIONS.

Under the original project of improvement of the Altamaha River, adopted in 1880, the following appropriations were made:

By act of Congress of—	
March 3, 1881	$5,000.00
August 2, 1882	15,000.00
July 5, 1884	20,000.00
August 5, 1886	20,000.00
August 11, 1888	10,000.00
	70,000.00
Unexpended balance of last appropriation carried to new project	223.41
Total	69,776.59

Since the existing project for improving Altamaha River was adopted, in 1890, the following appropriations have been made for this work:

By act of Congress of—	
August 11, 1888 (unexpended balance)	223.41
September 19, 1890	15,000.00
July 13, 1892	15,000.00
August 18, 1894	10,000.00
June 3, 1896	10,000.00
March 3, 1899	6,000.00
June 6, 1900 (allotted July 9, 1900, from emergency appropriation)	2,000.00
June 6, 1900 (allotted September 14, 1900, from emergency appropriation)	7,000.00
June 13, 1902	10,000.00
March 3, 1905	10,000.00
March 2, 1907 (amount allotted April 24, 1907, from appropriation for Altamaha, Oconee, and Ocmulgee rivers)	17,000.00
Total	102,223.41
November 30, 1906 (received from sale of Government property)	111.50
Grand total	172,111.50

(B) OCONEE RIVER.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Below Milledgeville.—Three thousand, five hundred and sixty-eight snags and 7 stumps were removed from the channel, 7,450 overhanging trees and 66 logs removed from the banks, and 221 trees on the banks girdled. This work was done between Milledgeville and the Central of Georgia Railway bridge, 28 miles above Dublin.

Between the Central of Georgia Railway bridge and The Forks 960 snags, 70 stumps, and 30 cubic yards of rock were removed from the channel, 339 overhanging trees and 13 logs removed from the banks, and 52 trees on the banks girdled.

At Buzzards bar, 74 miles above The Forks, 990 cubic yards of material were dredged from the channel.

At Fish Trap shoals, 73 miles above The Forks, 2,300 cubic yards of material were dredged from the channel, and a spur dam 165 feet in length was constructed, in which 220 cubic yards of brush fascines and 15 yards of stone were placed.

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The old training wall at Bonny Clabber was extended 261 feet, and a spur dam 31 feet in length was constructed. In this work 129 piles were driven and 352 cubic yards of brush fascines and 24 cubic yards of stone were placed.

At Ochwalkee a cut 183 feet in length was made through a rock shoal, a total of 464 cubic yards of rock and clay being removed.

At Mitchells Cut and Steamboat Bight a total of 2,750 cubic yards of material were dredged from the channel.

At McLeods Cut, 22 miles above The Forks, a training wall 402 feet in length was constructed, in which 359 piles were driven, 282 cubic yards of brush fascines, 40 cubic yards of stone, 12 cross-ties, and 309 linear feet of waling were placed. Seventy-five cubic yards of material were also dredged from the channel at this locality.

A new hull was constructed for the snag boat *Oconee*, and the machinery and upper works repaired, the cost of which was paid proportionately from allotments for the Altamaha, Oconee, and Ocmulgee rivers.

The above work has been of great benefit to commerce, especially over that section of the river between Milledgeville and Dublin. As a result of the work done between these two latter points, the rafting of timber has been carried on extensively, where previously this was impossible except at very high stages of the river.

All of the above work was done by hired labor, with the use of Government plant.

Above Milledgeville.—No work was done between the Georgia Railroad bridge (54 miles above Milledgeville) and the northern boundary of Greene County, no funds being available for work upon this section of the river.

Of the total amount expended during the fiscal year, viz, $16,407.30, the sum of $1,285.96 was for rock removal, $3,776.30 for snagging, $4,000 for dike work, $2,612.57 for dredging, $3,751.26 for construction and repair of plant, and $981.21 for contingencies.

COMMERCE AND NAVIGATION.

During the year 1907 the steamers plying the river between the Forks and the Central of Georgia Railway bridge, 25 miles above Dublin, handled 11,000 tons of freight, valued at $330,000. The commerce carried on the river between the Georgia Railroad bridge, above Milledgeville, and the northern boundary of Greene County during the same period amounted to 900 tons, valued at $27,000. In addition to this there were rafted down the river during the same year 51,800,000 feet B. M. of timber, valued at about $848,000. Excepting the timber traffic, the commerce of the river is carried on in detached sections tributary to the railroads crossing the river.

During the low-water season of 1907 two freight boats were sunk by obstructions and lost. Three new boats were constructed to take their places. The river has been very much improved during the past year, and it is expected that this will result in a greatly increased commerce.

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Money statement.

July 1, 1907, balance unexpended		$29,052.81
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$10,244.38	
For maintenance of improvement	6,162.92	
		16,407.30
July 1, 1908, balance unexpended		12,645.51
July 1, 1908, outstanding liabilities		1,645.46
July 1, 1908, balance available		11,000.05
Amount (estimated) required for completion of existing project		98,842.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$25,000.00	
For maintenance of improvement	4,000.00	
		29,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

AMOUNT AND DATE OF ALL APPROPRIATIONS.

Since the works of improvement were begun the following appropriations have been made:

By act of Congress of—	
June 18, 1878	$10,000.00
March 3, 1879	1,500.00
June 14, 1880	1,500.00
March 3, 1881	2,500.00
August 2, 1882	5,000.00
July 5, 1884	3,000.00
August 5, 1886	9,000.00
August 11, 1888	12,500.00
Total	45,000.00
Unexpended balance from last appropriation carried to new project	177.82
Total	44,822.18

Since the existing project for improving the Oconee River was adopted the following appropriations have been made for this work:

By act of Congress of—	
August 11, 1888 (unexpended balance)	$177.82
September 19, 1890	25,000.00
July 13, 1892	25,000.00
August 18, 1894	10,000.00
June 3, 1896	10,000.00
March 3, 1899	10,000.00
June 6, 1900, allotted July 9, 1900, from emergency appropriation	2,000.00
June 6, 1900, allotted March 22, 1901, from emergency appropriation	800.00
June 6, 1900, allotted June 19, 1901, from emergency appropriation	300.00
June 6, 1900, allotted July 11, 1901, from emergency appropriation	650.00
June 13, 1902	25,000.00
March 3, 1905	15,000.00
March 2, 1907 (allotted April 27, 1907, from appropriation for Altamaha, Oconee, and Ocmulgee rivers)	29,000.00
	152,927.82

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Amounts received from proceeds of sale of Government property:	
October 26, 1903	$43.00
October 21, 1904	15.00
February 17, 1905	590.77
Amount received by refundment:	
July 31, 1906	.50
Total	153,577.09
Grand total	198,399.27

(c) OCMULGEE RIVER.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Between Macon and Hawkinsville.—One hundred and thirteen snags and 21 stumps were removed from the channel, 30,000 overhanging trees and saplings and 126 logs removed from the bank and 176 trees on the bank girdled. Three hundred and forty cubic yards of brush fascines were placed in the training wall 1 mile below Macon. Three hundred and thirty tons of stone were collected and placed upon the banks of the river at Macon for use in repairing training walls in that vicinity.

Between Hawkinsville and The Forks.—One hundred and nine snags and 14 stumps were removed from the channel and 150 overhanging trees and 1 log removed from the banks of the stream.

At Hollingsworth Ferry, 411 cubic yards of brush fascines and 18 cubic yards of stone were collected and placed upon the banks for use in repairing the training wall at that point.

A new hull was constructed for the snag boat *Oconee* and repairs made to the machinery and upper works, the cost of which was paid proportionately from the allotments for the Altamaha, Oconee, and Ocmulgee rivers.

All of the work mentioned above was done by hired labor, with the use of Government plant.

Of the total amount expended during the fiscal year, viz, $12,154.89, the sum of $4,375.23 was for snagging, $1,500 for construction and repair of dikes, $4,834.31 for construction and repair of plant, and $1,445.35 for surveys and contingencies.

The final appropriation under the estimate of 1890 was made by act of June 28, 1902. In 1903 the district officer reported that the project was still uncompleted, and submitted an additional estimate of $75,000, exclusive of annual cost of maintenance, as being necessary to complete the improvement. Since that estimate was submitted there has been appropriated $44,000, but owing to provision for maintenance work, a further sum of $56,000, in addition to annual cost of maintenance, will be required to complete the project.

COMMERCE AND NAVIGATION.

A detailed discussion of this subject will be found on pages 1478 to 1484 of the Report of the Chief of Engineers for 1890, and page 1520 of the same report for 1897.

For several years past there has been no navigation at all between Macon and Hawkinsville, except that one small steamer made occa-

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sional trips to Macon. A company has been formed at Macon for the purpose of operating a line of steamers between that point and Brunswick, and at this time has two freight steamers plying the river, making regular trips between the two cities. Another steamer is being constructed at Lumber City for local traffic. It is expected that the future commerce of the river will be much greater than it has been in the past.

During the calendar year 1907 the steamers plying the river handled 10,996 tons of freight, valued at $600,000.

There were also rafted down the river 35,662,000 feet B. M. of timber, valued at $509,400.

Money statement.

July 1, 1907, balance unexpended		$29,571.74
Amount received from proceeds of sales, Government property		62.50
		29,634.24
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$9,943.62	
For maintenance of improvement	2,211.27	
		12,154.89
July 1, 1908, balance unexpended		17,479.35
July 1, 1908, outstanding liabilities		1,228.58
July 1, 1908, balance available		16,250.77
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$25,000.00	
For maintenance of improvement	5,000.00	
		30,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

AMOUNT AND DATE OF ALL APPROPRIATIONS.

Under the original project of improvement of the Ocmulgee River, adopted in 1876, the following appropriations were made:

By act of Congress of—	
August 14, 1876	$15,000.00
June 18, 1878	15,000.00
March 3, 1879	7,000.00
June 14, 1880	7,000.00
March 3, 1881	5,000.00
August 2, 1882	5,000.00
July 5, 1884	3,000.00
August 5, 1886	7,500.00
August 11, 1888	15,000.00
Total	79,500.00
Unexpended balance carried forward from last appropriation to new project	109.27
Total	79,390.73

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Since the existing project for improving Ocmulgee River was adopted the following appropiations have been made for the work:

By act of Congress of—	
August 11, 1888 (unexpended balance)	$109.27
September 19, 1890	30,000.00
July 13, 1892	25,000.00
August 18, 1894	10,000.00
June 3, 1896	10,000.00
March 3, 1899	20,000.00
June 6, 1900	40,000.00
March 3, 1901	40,000.00
June 28, 1902	56,000.00
March 3, 1905	15,000.00
March 2, 1907 (allotted April 27, 1907, from appropriation for Altamaha, Oconee, and Ocmulgee rivers)	29,000.00
Total	275,109.27
Amounts received from "Proceeds of sale of Government property:"	
November 12, 1902	106.00
October 28, 1903	43.00
February 17, 1905	590.76
February 21, 1908	62.50
Amounts received by refundments:	
Reclaimed by Captain Gillette	20.00
July 31, 1906	.45
Total	275,931.98
Grand total	355,322.71

O 6.

IMPROVEMENT OF CLUB AND PLANTATION CREEKS, GEORGIA.

No work will be undertaken until a legal title to the required right of way is obtained, since the channel would not be usable without the marsh cut.

Money statement.

Amount appropriated by river and harbor act approved March 2, 1907	$20,000
Amount (estimated) required for completion of existing project	20,700

APPROPRIATION.

March 2, 1907	$20,000

O 7.

IMPROVEMENT OF BRUNSWICK HARBOR, GEORGIA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Dredging under contract of September 9, 1907, with P. Sanford Ross (Incorporated), covering work under lot No. 1, inner harbor, was begun on December 10, 1907, and from that date up to the close of the fiscal year a total of 186,175.6 cubic yards of material were removed. Of this amount 157,886.3 cubic yards were removed from Academy Creek, 26,505 cubic yards from the upper shoal in Turtle

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River, and 1,784.3 cubic yards from the shoal in East River. There were also removed from Academy Creek 35 logs and poles, together with some old wreckage, encountered in dredging.

Dredging under contract of September 21, 1907, with the Coastwise Dredging Company, in lot No. 2, inner harbor, was begun on January 29, 1908, and from that date up to the close of the fiscal year a total of 10,153.4 cubic yards of material were removed from the shoal opposite Brunswick Point.

Dredging under the same contract in lot No. 3, Outer bar, was begun on January 10, 1908, and from that date up to the close of the fiscal year a total of 456,855.5 cubic yards of material were removed.

As the Coastwise Dredging Company were contractors both for lots Nos. 2 and 3, the minimum rate of progress has not been insisted upon in each work, but the contractor has been allowed to carry them forward together in such manner as would permit him to take advantage of favorable weather for difficult work, the aggregate rate, of course, being up to contract requirements.

Previous to the commencement of dredging, complete cross-section surveys were made of the channels to be improved in Academy Creek, East River, Turtle River, opposite Brunswick Point, and across the Outer bar, and the necessary monthly surveys have been made thereafter for the purpose of estimate. The results are favorable and show good progress and indicate that the entire work proposed can be accomplished for the original estimate.

A combined boathouse, storehouse, and tide-gauge shelter was constructed by hired labor upon land leased from the Atlanta, Birmingham and Atlantic Railway Company.

The suboffice at Brunswick was maintained and minor repairs were made to survey launches.

Of the total amount expended during the fiscal year, viz, $109,077.75, the sum of $19,320.36 was for dredging in lot No. 1, under contract of September 9, 1907, with P. Sanford Ross (Incorporated), at 14.8 cents per cubic yard; $75,498.44 for dredging in lots Nos. 2 and 3, under contract of September 21, 1907, with Coastwise Dredging Company, at 16.5 and 23 cents per cubic yard, respectively; $3,415.57, part cost of new engine and boiler and repairs to steamer *Angler;* $400.59 for construction of combined boathouse, storehouse, and tide-gauge shelter, and $10,442.79 for surveys and contingencies.

COMMERCE AND NAVIGATION.

Information in regard to the commerce of Brunswick before the improvement will be found on page 1523 of the Report of the Chief of Engineers for 1897.

The chief articles of export are cotton, lumber, cross-ties, naval stores, and phosphate rock, of which the shipments for the calendar year 1907 were as follows: Of cotton, 201,147 bales; of lumber and cross-ties, 235,000,000 feet, and of naval stores, 58,357 barrels of turpentine and 231,429 barrels of rosin, and 47,307 tons of phosphate rock.

Three regular lines of steamships made use of this port during 1907, comprising a total of 24 steamers. The Mallory Line operated between New York and Mobile, stopping at Brunswick both ways; the Clyde Line operated between Brunswick and Boston, and the

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"Bee Line" between New York and Brunswick and for a part of the year between New York and Havana, stopping at Brunswick. During the year 1907 they made 312 trips and carried 348,549 tons of freight.

On the inland waters there are a number of small steamers plying between Brunswick and adjacent ports, besides numerous schooners, small sailboats, and tugs and gasoline launches towing barges.

During the year 1907 this portion of the commerce amounted to 116,000 tons, valued at $3,076,000.

The total amount of freight received and shipped at the port during 1907 was 1,500,000 tons, valued at $45,091,756, an increase over 1906 of about 25 per cent.

Money statement.

July 1, 1907, balance unexpended	$158,770.75
Amount appropriated by sundry civil act approved May 27, 1908	303,000.00
	461,770.75
June 30, 1908, amount expended during fiscal year for works of improvement	109,077.75
July 1, 1908, balance unexpended	352,693.00
July 1, 1908, outstanding liabilities	41,162.26
July 1, 1908, balance available	311,530.74
July 1, 1908, amount covered by uncompleted contracts	325,031.73
Amount (estimated) required for completion of existing project	47,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	47,000.00

AMOUNT AND DATE OF ALL APPROPRIATIONS.

Since the work of improvement was begun the following appropriations have been made:

By act of Congress of—	
July 4, 1836	$10,000.00
March 3, 1879	20,000.00
June 14, 1880	10,000.00
March 3, 1881	5,000.00
August 2, 1882	25,000.00
July 5, 1884	10,000.00
August 5, 1886	22,500.00
August 11, 1888	35,000.00
September 19, 1890	35,000.00
July 13, 1892	27,500.00
Total	200,000.00
For maintenance:	
August 18, 1894	10,000.00
June 3, 1896	15,000.00
March 3, 1899	10,000.00
Total	235,000.00
Unexpended balance of last appropriation carried to new project	182.75
	234,817.25

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Under the project adopted by act of Congress approved June 13, 1902, the following appropriations have been made:		
By act of Congress of—		
March 3, 1899 (unexpended balance from last appropriation)...		$182.75
June 13, 1902:		
Outer bar	$40,000	
Inner harbor	120,000	
Academy Creek	5,000	
		165,000.00
March 3, 1905		40,000.00
July 31, 1906 (amount received by refundment)		.15
Total		205,182.90
Unexpended balance of last appropriation carried to new project		12,120.75
		193,062.15
Under the project providing for channels 30 feet in depth at mean high water, the following appropriations have been made:		
By act of Congress of—		
March 3, 1905 (unexpended balance from last appropriation)....		12,120.75
March 2, 1907		146,650.00
May 27, 1908		303,000.00
Total		461,770.75
Grand total		889,650.15

CONTRACTS IN FORCE.

Name and address of contractor: P. Sanford Ross (Incorporated), Jersey City, N. J.
Character and amount of work: Dreding, lot No. 1, 520,000 cubic yards.
Rate: 14.8 cents per cubic yard place measurement.
Date of approval: September 21, 1907
Work begun: December 10, 1907.
Expires: February 14, 1909.
Name and address of contractor: Coastwise Dredging Company, Norfolk, Va.
Character and amount of work: Dredging, lots Nos. 2 and 3, 230,000 and 1,500,000 cubic yards, respectively.
Rate: Lot No. 2, 16½ cents per cubic yard; lot No. 3, 23 cents per cubic yard place measurement.
Date of approval: October 5, 1907.
Work begun: Lot No. 2, January 9, 1908; lot No. 3, January 10, 1908.
Expires: August 29, 1909.

COMMERCIAL STATISTICS.

Commerce (coastwise, local, and foreign), 1907.

Value of exports:		
Coastwise		$10,694,847
Foreign		11,494,440
Value of imports		19,826,469
Value of local freight handled		3,076,000
		45,091,756

Statement of receipts of naval stores, 1907.

Rosin	barrels..	208,289
Spirits	do....	58,998

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Arrivals and clearances of vessels and commerce at Brunswick, Ga., 1907.

	Arrived.			Cleared.		
	Number.	Tonnage.	Crew.	Number.	Tonnage.	Crew.
Coastwise	433	565,488	9,251	443	572,424	9,337
Foreign ports:						
American vessels	28	24,441	652	18	17,505	566
Foreign vessels	88	131,361	1,890	88	128,533	1,924
Total	549	721,290	11,793	549	718,562	11,827

Greatest draft (cleared) 25 feet.

O 8.

IMPROVEMENT OF INSIDE WATER ROUTE BETWEEN SAVANNAH, GEORGIA, AND FERNANDINA, FLORIDA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

A resurvey of the inside waterway for the purpose of determining the best route for further improvement was provided for in the river and harbor act of March 2, 1907. The resurvey was begun, at the lower end of the route, near Fernandina, Fla., on August 5, 1907, and all field work was completed at the close of October, 1907. Working drawings of the survey were completed during February, 1908, but owing to the press of other work finished drawings had not been completed at the close of the fiscal year. The localities covered by the survey were as follows: Shoal near Dungeness; The Dividings; shoal near the mouth of Delaroche Creek; shoal near Frederica River; of One Mile Cut between the Altamaha River and Darien River, and of 3½ miles of the Altamaha River below One Mile Cut; Altamaha Sound; Little Mud River; Mud River, near Sapelo Sound; Old Teakettle Creek; The Narrows, between South Sapelo and Front Rivers; Johnsons Creek Dividings; South portion of the Florida Passage; Little Hell Gate; Shoal in Burnside River at the mouth of Back River; Wilmington River at the mouth of Habersham Creek, and the shoal at the mouth of St. Augustine Creek. Examinations were also made of the creeks adjacent to St. Andrews Sound for the purpose of ascertaining the feasibility of a passageway which would make it unnecessary for boats to cross this sound.

Work of raising the training wall near the head of Jekyl Creek and the jetty at the mouth of this creek, by the placing of some 45,000 bushels of oyster shell thereon, was commenced June 29, and during that day and the next a total of 2,245.9 bushels were placed in the work.

A cluster of piling was driven to mark the outer end of the jetty at the mouth of Jekyl Creek.

Sailing ranges were established to mark the channels dredged during the previous fiscal year. Day marks were subsequently placed by the Light-House Department at these localities.

A new hull for the survey launch *Cosine*, begun during the previous fiscal year, was completed.

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Of the total amount expended during the fiscal year, viz, $6,000.73, the sum of $50.65 was for outstanding liabilities on account of construction of training wall in Jekyl Creek; $364.50 for new hull for launch *Cosine*; $31.30 part cost of boathouse at Brunswick, and $5,554.28 for surveys, office expenses, and contingencies.

The original estimate for the improvement of this route was completed with the appropriation of $41,000 made by the river and harbor act of March 3, 1905, but the improvement was still unfinished. The reasons for this are set forth in a report of the district officer, with estimate of cost of the work remaining to be done, printed on page 1208 of the Annual Report of the Chief of Engineers for 1906. It is now estimated that $36,000, in addition to $10,000 annually for maintenance, will be required to complete the work under the present project.

COMMERCE AND NAVIGATION.

A detailed discussion of the commerce over this route will be found in the Report of the Chief of Engineers for 1901, page 1653.

The commerce over this route is carried on, to a large extent, by small schooners and barges. On the lower end of the route there are 7 steamboats making regular trips between Brunswick, Darien, Fernandina, St. Marys, St. Simons, Cumberland, and Jekyl Islands, and the Satilla River, with occasional trips to points on the Altamaha River. There are also a number of tugs which tow lighters carrying naval stores, lumber, and cross-ties. During the calendar year there was carried over the route 151,670 tons of freight, valued at $3,134,000.

Thirty-nine vessels (light) were towed over a portion of the route, and some 50 yachts, varying from 5 to 100 tons, passed over the route to and from the north.

In addition to the above, there were rafted or towed in rafts over this route during the same period 81,980,000 feet B. M. of timber, valued at $1,335,000.

Little, if any, of this commerce went over the entire route.

Money statement.

July 1, 1907, balance unexpended		$30,478.93
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$5,950.08	
For maintenance of improvement	50.65	
		6,000.73
July 1, 1908, balance unexpended		24,478.20
July 1, 1908, outstanding liabilities		2,193.75
July 1, 1908, balance available		22,284.45
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$36,000.00	
For maintenance of improvement	5,000.00	
		41,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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AMOUNT AND DATE OF ALL APPROPRIATIONS.

Previous to the existing project there were appropriated as follows:

Parsons Cut or Romerly Marshes, Georgia:	
Act of Congress approved—	
August 2, 1882	$10,000.00
July 5, 1884	10,000.00
August 5, 1886	17,475.00
August 11, 1888	4,633.77
Total by United States	42,108.77
From Georgia and Florida Steamboat Company	5,000.00
Total	47,108.77
Jekyl Creek, Georgia:	
Act of Congress approved—	
August 11, 1888	5,000.00
September 19, 1890	7,500.00
July 13, 1892	7,500.00
August 18, 1894	4,000.00
Total	24,000.00

Since the existing project for improving this route was adopted six appropriations, aggregating $135,000, have been made, as follows:

Inside route:	
Act of Congress approved—	
July 13, 1892	$15,000.00
August 18, 1894	20,000.00
June 3, 1896	14,000.00
June 13, 1902	15,000.00
March 3, 1905	41,000.00
March 2, 1907	30,000.00
Total	135,000.00
Grand total	206,108.77

O 9.

IMPROVEMENT OF SKIDAWAY NARROWS, GEORGIA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

A contract for the dredging necessary to complete the improvement was entered into on September 3, 1907, with the Savannah Dredging Company. Work was begun on October 12, 1907, and from that date up to the close of the fiscal year a net total of 114,052 cubic yards of material were removed.

On June 30, 1908, the total estimated quantity of material to be removed to complete the improvement was 123,948 cubic yards.

A complete survey of the Narrows was made previous to the commencement of work, and thereafter monthly surveys have been made for the purpose of estimate. These surveys indicated that the channel, as far as completed, is maintaining itself in a satisfactory manner.

Of the total amount expended during the fiscal year, viz, $14,020.04, the sum of $13,705.42 was for dredging under contract of September 3, 1907, with Savannah Dredging Company, at 13¾ cents per cubic yard, and $2,169.05 for surveys and contingencies.

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Although the improvement is far from complete, this route, which is about 6 miles shorter from Savannah to the south than the old route, is extensively used, but it is not practicable to separate its commerce from that of the inside route, of which it forms a part.

Money statement.

July 1, 1907, balance unexpended	$34,432.85
June 30, 1908, amount expended during fiscal year for works of improvement	14,028.04
July 1, 1908, balance unexpended	20,404.81
July 1, 1908, outstanding liabilities	4,197.60
July 1, 1908, balance available	16,207.21
July 1, 1908, amount covered by uncompleted contracts	15,973.54

APPROPRIATIONS.

March 3, 1905	$20,000
March 2, 1907	35,000
Total	55,000

CONTRACT IN FORCE.

Name and address of contractor: Savannah Dredging Company, Savannah, Ga.
Character and amount of work: Dredging 238,000 cubic yards.
Rate: 13¾ cents per cubic yard place measurement.
Date of approval: September 10, 1907.
Work begun: October 12, 1907.
Expires: August 12, 1908.

O 10.

IMPROVEMENT OF CUMBERLAND SOUND, GEORGIA AND FLORIDA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

The ship channel alongside the north jetty was straightened and deepened by the removal of 186,981 cubic yards of material. This work was done by the United States seagoing dredge *Cumberland* between February 14 and April 2, 1908, at a field cost of 3.8 cents per cubic yard, including cost of repairs to the dredge.

An examination of a portion of the bar near the south jetty was made in November, 1907, and a complete survey of the entrance was made in May, 1908. Four miles of the high-water line on the south end of Cumberland Island was located and platted for the purpose of comparison with a similar line located by the United States Coast and Geodetic Survey in 1857. A cross-section survey of the outer end of the south jetty was made and ranges were established marking the ship channel along the north jetty.

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A contract was entered into on May 25, 1908, with Rod
Ross, of Jacksonville, Fla., for raising and repairing the sou
involving the placing of about 30,000 tons of stone. Un
terms of the contract work is to be commenced not lat
August 10, 1908.

All work done during the fiscal year was in connection
maintenance of the improvement.

June 30, 1908, only a small area, of less than 1,000 feet in
had a depth of less than 24 feet at mean low water. Th
between the jetties and beyond the same continues to move s
advancing 400 feet during the past fiscal year. Since 1903 th
has advanced 2,900 feet, and the crest of the shoal, as define
18-foot contour, decreased 30 per cent during the past yea
condition of the jetties remains practically the same as one y

The inner ends of the jetties are now well sanded up an
appears to be no present danger of their being flanked. Th
in front of the Cumberland Island dike continues to enlarge
cut-off on Beach Creek has deepened to such an extent that i
the greater portion of the flow of this creek away from th
The dike itself is in good condition and has fulfilled the purp
which it was intended.

A comparison of the survey made in 1908 with that made i
shows that only moderate erosion has occurred for 4 miles
the shore at the south end of Cumberland Island, the ma
being about 450 feet. The high-water line at the lower end
stretch is rapidly making out, and there is nothing whatever t
that the construction of the north jetty has caused any d
whatever to the island.

Of the total amount expended during the fiscal year, viz, $16,2
the sum of $7,282.13 was for dredging by the United States
Cumberland at 3.8 cents per cubic yard, including cost of r
$3,325 part cost of new engine and boiler and repairs to h
steamer *Angler*, and $5,666.19 for surveys, contingencies, and
expenses.

For commerce and navigation, see report on Fernandina H
Appendix 11.

Money statement.

July 1, 1907, balance unexpended	$117,
Amount received from refundment	
	117,
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	16,
July 1, 1908, balance unexpended	100,
July 1, 1908, outstanding liabilities	
July 1, 1908, balance available	100,
July 1, 1908, amount covered by uncompleted contracts	74,
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	50,

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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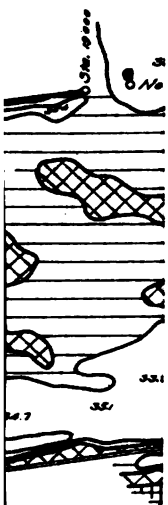

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AMOUNT AND DATE OF ALL APPROPRIATIONS.

Under the original project for improving Cumberland Sound the following appropriations were made for the work:

By act of Congress of—	
June 14, 1880	$30,000
March 3, 1881	100,000
August 2, 1882	50,000
July 5, 1884	75,000
August 5, 1886	112,500
August 11, 1888	112,500
Total	480,000

Under the revised project of improvement the following appropriations were made:

By act of Congress of—	
September 19, 1890	$112,500
July 13, 1892	170,000
August 17, 1894	170,000
Total	452,500

Under the existing project of improvement the following appropriations have been made:

By act of Congress of—	
June 3, 1896	$5,000.00
June 4, 1897	350,000.00
July 19, 1897	50,000.00
July 1, 1898	450,000.00
March 3, 1899	400,000.00
March 3, 1901	200,000.00
June 28, 1902	400,000.00
March 3, 1903	400,000.00
April 28, 1904	55,000.00
March 3, 1905, river and harbor act	30,000.00
March 3, 1905, sundry civil act	40,000.00
March 2, 1907	75,000.00
Total	2,455,000.00
Refundments	3,944.13
June 29, 1907, proceeds of sales of Government property	8.90
Total	2,458,953.03
Grand total	3,391,453.03

CONTRACT IN FORCE.

Name and address of contractor: Roderick G. Ross, Jacksonville, Fla.
Character and amount of work: Repairs to stone jetty; 30,000 tons of stone.
Rate (in place): $2.47 per ton.
Date of approval: June 6, 1908.
Work begun: (To be commenced August 10, 1908.)
Expires: March 10, 1909.

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O 11.

IMPROVEMENT OF FERNANDINA HARBOR, FLORIDA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

A contract was entered into on July 20, 1907, with the N. American Dredging Company, for executing all dredging provi for by the project. Work was begun by the contractor on Septem 14, 1907, in constructing bulkheads behind which to pump dred material. Since this was a necessary preliminary to the contract method of dredging, this date was allowed as the date of commen ment of work under the contract. The contractor's dredge arriv at Fernandina on December 18, 1907, and active dredging operati were begun on December 19. From the latter date up to the cl of the fiscal year a net total of 484,761.2 cubic yards of material w removed. The indications at the close of the year were that all dred ing would be completed about the middle of August, 1908.

In accordance with the instructions contained in Departme indorsement of March 15, 1907, a new system of harbor lines w tentatively established to embrace that portion of the new chan in the upper part of the harbor. A tracing, showing the new lin was prepared. A public hearing, to consider the new system of h bor lines, will be held at Fernandina as early as practicable duri the next fiscal year and report prepared for the action of the Depa ment. This public hearing was intentionally delayed until after completion of the dredging, because it was thought that the pro relation of shore line to deep water could then be better understo

Of the total amount expended during the fiscal year, viz, $85,092. the sum of $72,160.05 was for dredging under contract of July 1907, with North American Dredging Company at 17¾ cents per cu yard; $90 part cost of construction of boathouse at Brunswick, G $3,752.69 part cost of new engine and boiler and repairs to hul steamer *Angler*, and $9,090.24 for surveys and contingencies.

COMMERCE AND NAVIGATION.

Neglecting the commerce of St. Marys, Ga., which amounted the shipment of 1,270,000 feet of timber, the total commerce of harbor of Fernandina during the calendar year 1907 amounted 730,000 tons, with a value of about $14,363,429. The chief artic of export are lumber, phosphate rock, and naval stores, of which shipments for the year 1907 were as follows: Lumber, 151,962,0 superficial feet; phosphate rock, 108,345 tons; rosin, 756,971 b rels, and turpentine, 101,000 casks. The details of this comme are given in the tables appended hereto.

Money statement.

July 1, 1907, balance unexpended	$115,000.
June 30, 1908, amount expended during fiscal year for works of improvement	85,092.
July 1, 1908, balance unexpended	29,907.
July 1, 1908, outstanding liabilities	14,776.
July 1, 1908, balance available	15,130
July 1, 1908, amount covered by uncompleted contracts	7,419.99

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APPROPRIATION.

March 2, 1907 ..... $115,000

CONTRACT IN FORCE.

Name and address of contractor: North American Dredging Company, New York, N. Y.
Character and amount of work: Dredging 528,000 cubic yards, place measurement.
Rate: 17¾ cents per cubic yard.
Date of approval: August 6, 1907.
Work begun: September 14, 1907.
Expires: August 8, 1908.

Commerce.

Value of exports and imports:	
Coastwise, foreign and local	$14,363,429.00
Lumber and timber shipments:	
Foreign, 148,315,000 feet, valued at	4,410,430.00
Coastwise, 3,647,000 feet, valued at	91,175.00
	4,501,605.00
Duties collected	11,031.33

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels and commerce at Fernandina, Fla., 1908.

	Arrived.			Cleared.		
	Number.	Tonnage.	Crew.	Number.	Tonnage.	Crew.
Coastwise	82	147,700	1,860	15	18,338	173
Foreign ports:						
American vessels	12	7,275	118	4	1,481	29
Foreign vessels	82	137,705	1,784	148	264,266	3,484
Total	176	292,680	3,762	167	284,085	3,686

O 12.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

The removal of the wreck of the American schooner *Arthur C. Wade* was reported on pages 1302–1303 of my Annual Report for 1907, but owing to the fact that certain articles recovered from the wreck had not been disposed of and the cost of repairs made to Government plant incident to the removal of the wreck had not been determined, it was impossible to state in that report the exact cost of removal. During the past fiscal year $3,116.51 was expended, including the balance remaining from the allotment, viz, $1,918.72, which was returned to the Treasury. The total cost of removing the wreck was $4,081.28, which amount, however, should be reduced by the sum transferred to the appropriation by the Light-House Establishment in payment for certain chain which was removed from the wreck and sold to the sixth light-house district for use in anchoring buoys.

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APPENDIX P.

IMPROVEMENT OF RIVERS AND HARBORS IN THE JACKSONVILLE, FLORIDA, DISTRICT.

REPORT OF LIEUT. COL. LANSING H. BEACH, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. St. Johns River, Florida.
2. St. Johns River, Florida, opposite the city of Jacksonville.
3. St. Johns River at Orange Mills flats, Florida.
4. Volusia bar, Florida.
5. Oklawaha River, Florida.
6. Indian River, Florida.
7. Biscayne Bay, Florida.
8. Harbor at Key West, Florida, and entrance thereto.
9. Kissimmee River, Florida.
10. Orange River, Charlotte Harbor, and Caloosahatchee River, Florida.
11. Sarasota Bay, Florida.
12. Manatee River, Florida.
13. Tampa Bay, Florida.
14. Hillsboro Bay, Florida.
15. Crystal, Anclote, and Suwanee rivers, Florida.
16. Withlacoochee River, Florida.
17. Removing the water hyacinth from Florida waters.

UNITED STATES ENGINEER OFFICE,
Jacksonville, Fla., July 20, 1908.

SIR: I have to submit herewith annual report upon river and harbor works in this district for the fiscal year ended June 30, 1908.

Very respectfully,

LANSING H. BEACH,
Lieut. Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

P 1.

IMPROVEMENT OF ST. JOHNS RIVER, FLORIDA.

The contract made with R. G. Ross, July 3, 1906, for dredging and rock removal at Trout Creek shoal (see p. 1306, Report of the Chief of Engineers for 1907) was completed December 1, 1907.

During the past fiscal year 8,137.87 cubic yards of rock and 6,935.2 cubic yards of other material, consisting mostly of clay, were removed under this contract. The contract prices were, for rock $4.33, and for other material $0.2275 per cubic yard. At these figures the cost was $36,788.76.

During the fiscal year the work was being done under an extension of the time for completion of the contract and under the stipulation that the cost of superintendence and inspection was to be borne by the contractor. There was therefore no extra cost to the United States.

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The result of this work was the formation of a channel through Trout Creek shoal 300 feet wide and 24 feet deep, excepting for a few detached shoals of rock mixed with softer material along the easterly side of the cut, having a least depth of 21 feet over them. The clear width of that portion of the channel having a depth of 24 feet is about 230 feet, measured from the westerly side of the cut.

The U. S. dredge *Jacksonville*, after completing the channel at Arlington shoal, redredged Mile Point Cut and did a small amount of work at White Shells Cut. This dredge was brought to Jacksonville November 16, 1907, and after being overhauled and repaired, proceeded to Wilmington, N. C., for work in that district. The dredge left Jacksonville January 25, 1908, and arrived in Wilmington January 30, 1908. It was still in that district at the close of the fiscal year.

While working in this district during the past fiscal year this dredge removed 262,344.4 cubic yards of material. The depth of the different cuts was slight in each case and much shifting of the dredge and pipe line was required. The total cost of this work, including superintendence and its proportion of office and surveying expenses and other incidentals, was $35,680.90, or 13.6 cents per cubic yard. The field cost per cubic yard was 11.2 cents.

The dredged channel of White Shells having shoaled considerably during the year, an allotment of $10,000 was made November 26, 1907, from the emergency fund provided by the river and harbor act of March 2, 1907, for the purpose of restoring its depth.

The dredge *St. Johns* began work under this allotment February 19, 1908, and continued dredging until February 28. On that date an accident to her dumping gates suspended work until March 5, when it resumed work and continued dredging until March 17, when it met with an accident to its rudder stock and keel. A total of 54,022 cubic yards was removed by this dredge, at a total cost of $7,968.32 for repairs and all other incidentals, or 14.75 cents per cubic yard. The field cost was 11.23 cents per cubic yard.

The dredge *Key West* began work at White Shells shoal under this allotment on March 20, and ceased operations March 31 on account of lack of funds, the cut not having been restored to full depth and width. During this time this dredge removed 20,846.9 cubic yards, at a total cost of $1,931.68, or 9.27 cents per cubic yard. The field cost was 8.34 cents per cubic yard.

As a result of this work the channel at White Shells shoal was restored to a depth of 24 feet for a width of 150 feet.

Owing to the presence of a greater amount of rock than had been anticipated and to an increase in the scope of the project by making the channel at Dames Point 400 feet wide and 25 feet deep, instead of 300 feet wide and 24 feet deep as originally contemplated, it has been found necessary to increase the estimated cost of completing the improvement $67,000. The work to be done with this sum is in the cuts at Trout Creek and White Shells. The condition of the channel at these places is explained elsewhere.

The map of the entrance to the river from a survey made in June, submitted herewith, shows a continued improvement of the conditions at that place. For the first time in the history of this improvement the bar shoal has made no advance seaward during the year. There

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is an available channel across the outer shoal at the bar of 30 feet in depth. The shoal place at a point about 2,500 feet inside the outer end of the jetties has increased in depth from 23 feet, as shown on the map of last year, to 24 feet. The channel through Wards Bank shoal, about 1 mile farther in, completed by the U. S. dredge *St. Johns* in June, 1907, remains in good condition and has a least depth of 25 feet throughout. The building up of the inner portion of the north jetty in April to June, 1907, has no doubt prevented a large movement of sand across this jetty and materially aided in producing the good results obtained. This jetty should be rebuilt to its former height throughout its length.

The south jetty has deteriorated to such an extent that it now but partially serves the purpose for which it was built. Great volumes of sand are swept through its many large gaps into the channel, and its immediate restoration can not be too strongly urged. To place both jetties in proper condition is a work of maintenance which is estimated to cost $225,000; to maintain the dredged channel in the river will, it is estimated, cost $75,000, a total of $300,000.

Money statement.

July 1, 1907, balance unexpended		$112,997.13
July 1, 1907, receipts from sales		342.41
November 26, 1907, allotted from emergency act March 2, 1907		10,000.00
		123,339.54
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$12,135.04	
For maintenance of improvement	109,900.00	
		122,035.04
July 1, 1908, balance unexpended		1,304.50
July 1, 1908, outstanding liabilities		50.00
July 1, 1908, balance available		1,254.50
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$67,000.00	
For maintenance of improvement	300,000.00	
		367,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS FOR IMPROVEMENT OF ST. JOHNS RIVER, FLORIDA.

Under the original project the following appropriations were made for the work:

June 14, 1880	$125,000	September 19, 1890	$170,000
March 3, 1881	100,000	July 13, 1892	112,500
August 2, 1882	150,000	March 3, 1893	284,500
July 5, 1884	150,000		
August 5, 1886	150,000	Total	1,417,000
August 11, 1888	175,000		

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Under the existing project of improvement appropriations have been made:

June 3, 1896	$200,000.00
March 3, 1899	200,000.00
June 13, 1902	[a] 350,000.00
March 3, 1903	350,000.00
April 28, 1904	395,000.00
March 3, 1905 (sundry civil act)	205,000.00
March 3, 1905	[b] 100,000.00
June 6, 1900 (allotment of Dec. 20, 1901, from emergency appropriation)	10,000.00
June 30, 1906 (sundry civil act)	309,750.00
March 2, 1907	100,000.00
June 13, 1902 / March 3, 1905 \ (allotment of Jan. 3, 1907, from emergency appropriation)	12,339.02
Unexpended balance, allotment for River and Harbor Board	89.16
Receipts from sales	2,462.54
Refundments of overpayments	31.83
Receipts for damage to Government property	450.00
March 2, 1907 (allotment of Nov. 26, 1907, from emergency appropriation)	10,000.00
Total	2,245,122.55

CONTRACT IN FORCE.

Contractor: Roderick G. Ross.

Amount and character of material: Dredging 75,000 cubic yards soft material; removing 15,500 cubic yards rock.

Price: Rock, $4.33 per cubic yard; material other than rock, 22½ cents per cubic yard.

Date of approval: July 20, 1906.

Date of beginning work: August 23, 1906.

Date of expiration: December 23, 1906 (extended for reasonable period).

COMMERCIAL STATISTICS.

Commerce of St. Johns River, Florida, during the year ending December 31, 1907.

[Furnished by the Jacksonville Board of Trade.]

Articles.	Gross tonnage.	Value.	Articles.	Gross tonnage.	Value.
Bacon	12,462	$2,492,400	Lumber	1,847,919	$18,087,505
Canned goods	1,500	300,000	Merchandise	418,246	8,364,920
Cement	14,708	103,456	Naval stores	160,686	11,200,000
Coal	181,678	1,090,068	Oil and gasoline	14,000	280,000
Cotton	2,163	432,600	Oranges	125,477	6,273,800
Fertilizers	49,087	981,740	Pineapples	4,391	175,640
Fish and oysters	500	100,000	Railroad supplies	5,355	107,100
Flour	6,961	417,660	Sash, doors, and blinds	3,975	397,500
Fruits	4,391	878,200	Shingles	40,747	4,074,800
Grain	16,554	331,080	Tobacco	1,000	2,000,000
Hay	30,500	762,500	Vegetables	19,225	1,153,000
Hides	1,950	234,000			
Kaolin	20,175	605,250	Total	2,485,610	60,627,219
Live stock	1,960	784,000			

[a] Continuing contract for $950,000.

[b] Continuing contract for $309,750.

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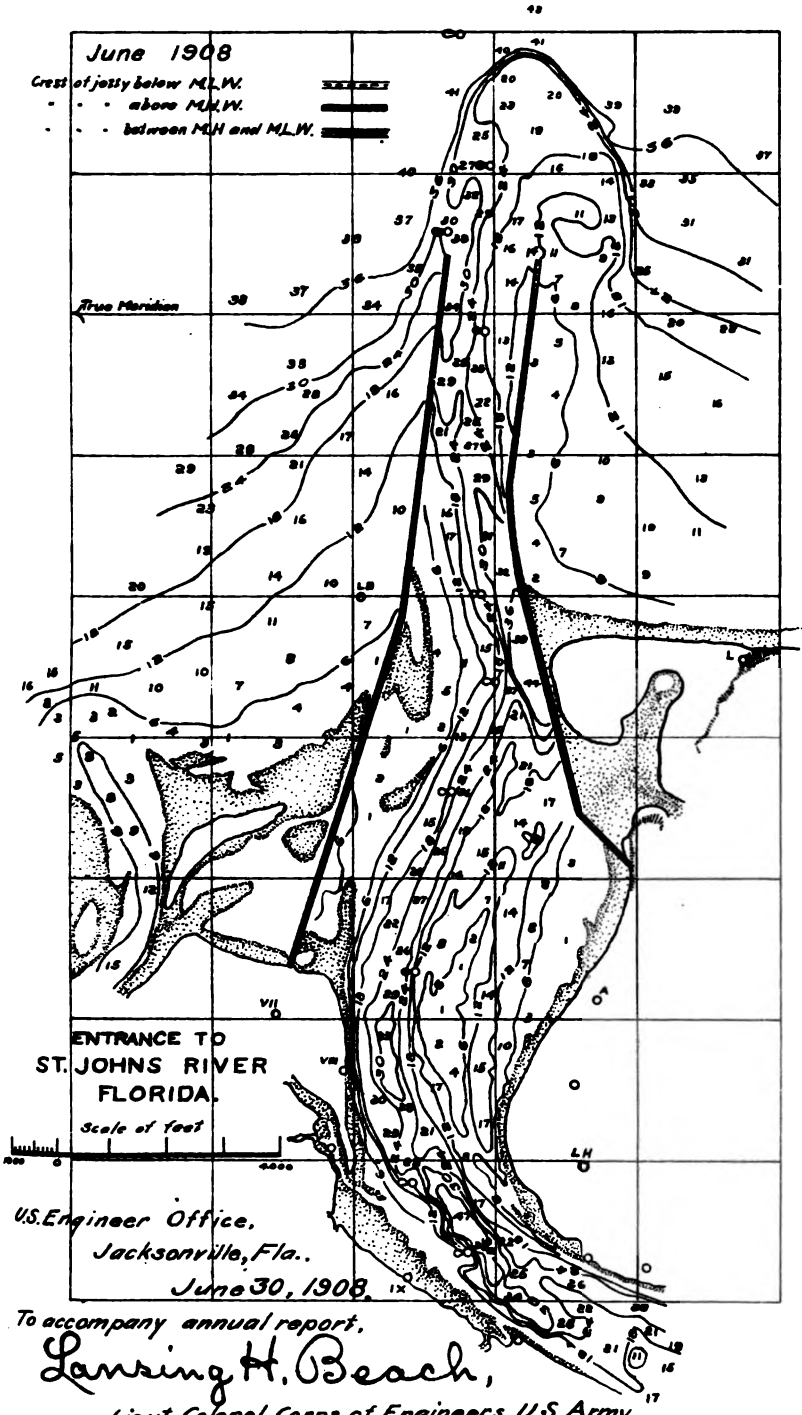

To accompany annual report.

Lansing H. Beach,

Lieut. Colonel, Corps of Engineers, U.S. Army.

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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Arrivals and departures of vessels for the year ending December 31, 1907.

Kind of vessel.	Arrivals.		Departures.	
	Number.	Tons.	Number.	Tons.
Steamers	348	1,205,000	346	1,211,000
Sailing vessels	443	398,700	434	390,000
Yachts	*		*	

* Large number; no record kept.

Estimated percentage of total trade of neighborhood carried by water, 50.
Probable increase of trade were the improvement completed, 100 per cent.
Probable effect of the project on freight rates: Establishment of new schooner line reduced rates about 25 per cent.
Transportation business established during 1907: Benner Line schooners.
Transportation business abandoned during 1907: None.
The draft of vessels here has increased, the deepest clearing being 21.6.
The tonnage of the vessels has also materially increased as follows: 1906, 1,344 tons; 1907, 2,027 tons.

P 2.

IMPROVEMENT OF ST. JOHNS RIVER, FLORIDA, OPPOSITE THE CITY OF JACKSONVILLE.

Under the appropriation of $371,500 made in the river and harbor act of March 2, 1907, a contract was made with P. Sanford Ross (Incorporated), September 11, 1907, for the removal of rock and other material in order to obtain a depth of 24 feet from the existing channel to the established pierhead line on the left bank of the river in front of the business section of the city of Jacksonville, between the Florida East Coast Railway bridge and Hogans Creek. The contract price was $3.03 per cubic yard.

The funds available not being sufficient to complete the work contemplated in the contract at this price, a supplemental contract was made October 8, 1907, authorizing a reduction in the amount of work to be done. Operations under this contract began October 1, 1907, and were in progress during the rest of the fiscal year. Forty-three thousand two hundred and eight and forty-three one-hundredths cubic yards were removed, at a cost of $130,921.54. Including incidentals, the cost was $3.318 per cubic yard.

For further information see current summary, page 348.

Money statement.

July 1, 1907, balance unexpended	$371,500.00
June 30, 1908, amount expended during fiscal year for works of improvement	112,350.88
July 1, 1908, balance unexpended	259,149.12
July 1, 1908, outstanding liabilities	31,021.19
July 1, 1908, balance available	228,127.93
July 1, 1908, amount covered by uncompleted contracts	169,049.46
Amount (estimated) required for completion of existing project	215,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	215,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

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APPROPRIATION.

March 2, 1907 ..... $371,500

CONTRACT IN FORCE.

Contractor: P. Sanford Ross (Incorporated).
Amount and character of material: About 99,000 cubic yards of rock, sand, and clay.
Price per unit: $3.03 per cubic yard.
Date of approval: September 23, 1907.
Date of beginning work: October 1, 1907.
Date of expiration: April 1, 1909.

COMMERCIAL STATISTICS.

See report for Improving St. Johns River, Florida, general improvement.

P 3.

IMPROVEMENT OF ST. JOHNS RIVER, FLORIDA, AT ORANGE MILLS FLATS.

Under the appropriation of $15,000, made in the river and harbor act of March 2, 1907, a contract was made October 25, 1907, with P. Sanford Ross (Incorporated) for dredging on this improvement. Work began December 6, 1907, and ceased April 6, 1908, owing to exhaustion of funds. A total of 193,951.3 cubic yards was removed during this period, resulting in an increase of the channel width through Forresters Point shoal from 40 feet, previously existing, to 160 feet throughout.

For further information see current summary page 349 and Report of Chief of Engineers for 1898, pages 1344–1348; for 1901, page 1738; for 1904, pages 1690–1691; for 1906, page 1218.

Money statement.

July 1, 1907, balance unexpended	$26,230.74
June 30, 1908, amount expended during fiscal year for works of improvement	24,737.24
July 1, 1908, balance unexpended	1,493.50
Amount (estimated) required for completion of existing project	65,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	65,000.00

APPROPRIATIONS.

March 3, 1899	$40,000
June 13, 1902	30,000
March 3, 1905	25,000
March 2, 1907	25,000
Total	120,000

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CONTRACT IN FORCE.

Contractor: P. Sanford Ross (Incorporated).
Amount and character of material: About 194,000 cubic yards of sand and mud.
Price: $0.12 per cubic yard.
Date of approval: November 6, 1907.
Date of beginning work: December 6, 1907.
Date of expiration: April 6, 1908.

COMMERCIAL STATISTICS.

Commerce of Orange Mills flats, Florida, during the year ending December 31, 1907.

[Furnished by the Palatka Board of Trade.]

Articles.	Gross tonnage.	Articles.	Gross tonnage.
Bacon	1,300	Merchandise	45,000
Canned goods	270	Naval stores	12,500
Cement	550	Oil and gasoline	375
Coal	3,000	Railroad supplies	550
Cross-ties	7,250	Sash, doors, and blinds	15,000
Fertilizers	325	Shingles	14,000
Fish and oysters	350	Tobacco	150
Grain	13,750	Vegetables	1,500
Hay	28,000		
Kaolin	3,000	Total	273,070
Live stock	200		
Lumber:			
Cypress	56,000		
Yellow pine	70,000		

Arrivals and departures of vessels for the year ending December 31, 1907.

There are 7 lines of river steamers (10 steamers), averaging 550 tons each.
Estimated percentage of total trade of neighborhood carried by water, 80.
Probable increase of trade were the improvement completed: A 16-foot channel to Palatka would increase traffic 200 per cent.
Probable effect of the project on freight rates: A saving of 20 to 25 per cent.

P 4.

IMPROVEMENT OF VOLUSIA BAR, FLORIDA.

With the balance of the funds provided by the allotment of $5,000, June 3, 1907, from the emergency appropriation of March 3, 1905, work was continued with the U. S. dredge and snag boat *Florida* from July 1 to July 31, 1907. During that month 20,354.6 cubic yards of material were removed and the following cuts made: A cut 120 feet wide and 1,200 feet long through the shoal at Volusia Cove Beach; another around the point at Volusia Cove, 925 feet long, 495 feet being 120 feet wide and the remainder 60 feet wide; one around the point at Florida Bend 350 feet long and 60 feet wide; one through Indian flats, 450 feet long and 120 feet wide; one across the point at Dark Alley for a distance of 375 feet, 60 feet wide, and one 615 feet long, 60 feet wide, at North Manuels Bend. The total cost of this work, including subsequent repairs to the vessel chargeable to this improvement, amounted to $3,880.66.

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Money statement.

July 1, 1907, balance unexpended	$5,510.03
June 30, 1908, amount expended during fiscal year for maintenance of improvement	5,510.03
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 14, 1880	$5,000	March 3, 1899	$2,000
March 3, 1881	5,500	June 13, 1902	2,000
August 2, 1882	5,000	April 28, 1904	2,000
July 5, 1884	2,000	March 3, 1905	2,000
August 5, 1886	7,500	March 2, 1907	2,000
August 11, 1888	500	March 3, 1905 (allotment June 3, 1907, from emergency appropriation)	5,000
September 19, 1890	500		
July 13, 1892	1,000		
August 18, 1894	1,000		
June 3, 1896	1,000	Total	44,000

COMMERCIAL STATISTICS.

Commerce of Volusia bar, Florida, during the year ending December 31, 1907.

[Furnished by the Clyde Steamship Company.]

Articles.	Gross tonnage.	Value.	Articles.	Gross tonnage.	Value.
Bacon	183	$36,600	Merchandise	16,300	$1,630,000
Canned goods	1,235	74,100	Naval stores	2,040	51,000
Cement	40	500	Oil and gasoline	47	940
Coal	25	150	Oranges	4,450	155,750
Cross-ties	4,300	12,900	Railroad supplies	60	2,400
Fertilizers	2,025	50,000	Sash, doors, and blinds	31	3,100
Fish and oysters	750	75,000	Shingles	14	280
Flour	965	48,250	Shoes	200	50,000
Fruits	500	30,000	Sirup, honey, etc	25	2,500
Grain	2,500	75,000	Tobacco	25	6,250
Hay	1,940	38,800	Vegetables	1,000	50,000
Hides	25	3,750			
Live stock	325	32,500	Total	66,005	2,753,770
Lumber:					
Cypress	9,000	180,000			
Yellow pine	18,000	144,000			

Remarks.—It is very necessary for this bar to be dredged, steamers *City of Jacksonville* and *Frederick De Barry* being unable to carry full loads on account of insufficient water.

Arrivals and departures of vessels for year ending December 31, 1907.

Kind of vessel.	Arrivals.		Departures.	
	Number.	Tons.	Number.	Tons.
Steamer	350	100,450	350	100,450

Estimated percentage of total trade of neighborhood carried by water, 60.
Probable increase of trade, were the improvement completed, 30 per cent.
Probable effect of the project on freight rates: Will tend toward a reduction.

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P 5.

IMPROVEMENT OF OKLAWAHA RIVER, FLORIDA.

Work under the appropriation of $15,000 made in act of March 2, 1907, was begun with the U. S. dredge and snag boat *Florida* August 15, 1907, and continued until October 5, when the river began falling so rapidly that it was considered unsafe to allow a boat of its size to remain in the stream, and was accordingly returned to Jacksonville October 20. During the two months that it was in the river this boat removed 343 cubic yards of rock, 2,840 cubic yards of marl, 834 snags, and 64 overhanging trees between the mouth of the river and a point 32 miles above. The total expenditure on this work, including repairs to the boat and other incidentals, was $6,335.18.

On August 19, 1907, a contract was made with Roland Woodward, of Jacksonville, Fla., for the hire of the small dredge *Hustler*, with crew and accessories, at the rate of $40 per day for work on this improvement. Work with this dredge was begun October 14, 1907, and continued until March 13, 1908, when operations ceased owing to lack of funds. With this plant, 8,033 cubic yards of sand and mud were dredged, 418 snags, 111 overhanging trees, 984 sunken logs, 21 floating islands, and 14,670 square yards of water hyacinths were removed between points 77 and 43 miles, respectively, above the mouth of the river. The cost of this work was $6,273.94.

The portion of the work above Silver Springs Run was completed to a depth of 3 feet at mean low stage of the river, and practically all obstructive snags in that portion of the stream and for a distance of 10 miles below Silver Springs Run were removed. An increase of 1 foot in depth over several shoal places is still required, and work of maintenance will be necessary. The funds available were insufficient to make the cut-offs proposed in the lower river, and none of this work was undertaken. The channel 6 feet deep called for in the project to Silver Springs Run was obtained from the mouth to a point 32 miles upstream. Silver Springs Run is 53 miles above the mouth.

For further information see current summary, page 351, and Report of Chief of Engineers for 1896, pages 1314–1316; for 1905, page 1298.

Money statement.

July 1, 1907, balance unexpended		$13,068.34
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$10,670.63	
For maintenance of improvement	2,208.07	
		12,878.70
July 1, 1908, balance unexpended		189.64
Amount (estimated) required for completion of existing project		18,208.07
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$18,208.07	
For maintenance of improvement	5,000.00	
		23,208.07
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

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APPROPRIATIONS.

September 19, 1890	$10,000	June 13, 1902	$2,000
July 13, 1892	1,000	March 3, 1905	2,000
August 18, 1894	3,000	March 2, 1907	15,000
June 3, 1896	3,000		
March 3, 1899	3,000	Total	39,000

CONTRACT IN FORCE.

Contractor: Roland Woodward.
Contract: For hire of dredging plant.
Price: $40 per day.
Date of approval: September 3, 1907.
Date of beginning work: October 14, 1907.
Date of completion: March 13, 1908.

COMMERCIAL STATISTICS.

Commerce of Oklawaha River, Florida, during the year ending December 31, 1907.

Articles.	Gross tonnage.	Articles.	Gross tonnage.
Cotton	19	Oranges	191
General merchandise	4,680		
Naval stores	4,239	Total	9,129

Probable effect of the project on freight rates: Would be a reduction of 15 to 20 per cent.
Probable increase of trade were the improvement completed, 50 per cent.

P 6.

IMPROVEMENT OF INDIAN RIVER, FLORIDA.

Between Goat Creek and Jupiter Inlet.—Under the appropriation of $9,000 made in act of March 2, 1907, the U. S. dredge and snag boat *Florida* was prepared for the work, and proceeded to New Smyrna January 23, 1908, and thence by inland route to Indian River. Owing to a continued unusual low stage of the water much difficulty was experienced in reaching the site of the work. Goat Creek was reached March 27, 1908, after dredging about 65,000 cubic yards from shoal places en route to enable the dredge to pass.

At the end of the fiscal year the dredge was working at a shoal place about 1 mile below St. Lucie Inlet. Between Goat Creek and this point the dredge had removed at the end of the year 81,015.9 cubic yards. The dredging done in the channel north of Goat Creek was of material benefit to navigation, although not within the limits of the project.

On April 3, 1908, an allotment of $5,000 was made from the emergency river and harbor appropriation, and on May 26, 1908, a similar

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allotment of $5,000 was made from the same appropriation for the maintenance of the channel between Goat Creek and Jupiter Inlet.

The total amount dredged was 145,591.9 cubic yards, at a cost of $18,534.27, or 12.7+ cents per cubic yard. As a result of this work the channel depth of not less than 5 feet has been restored for a width of not less than 60 feet as far south as a point about 1 mile below St. Lucie Inlet. The channel below that point is reported to be in fair condition.

Money statement.

July 1, 1907, balance unexpended	$9,327.76
Allotted from emergency river and harbor act of March 2, 1907	10,000.00
	19,327.76
June 30, 1908, amount expended during fiscal year for maintenance of improvement	15,685.50
July 1, 1908, balance unexpended	3,642.26
July 1, 1908, outstanding liabilities	2,848.77
July 1, 1908, balance available	793.49
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	9,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

July 13, 1892 (between Goat Creek and Jupiter Inlet)	$15,000.00
August 18, 1894 (Negro Cut)	5,000.00
March 2, 1895 (Negro Cut)	15,000.00
February 26, 1896 (Jupiter Inlet)	500.00
June 3, 1896 (Negro Cut)	7,500.00
March 3, 1899 (Negro Cut)	5,000.00
June 13, 1902 (between Goat Creek and Jupiter Inlet)	2,000.00
March 3, 1905 (between Goat Creek and Jupiter Inlet)	20,000.00
Allotment from emergency river and harbor appropriation of June 6, 1900 (for opening Jupiter Inlet, February 2, 1901, $800; February 28, 1901, $200)	1,000.00
For rent of dredge	14.62
March 2, 1907 (between Goat Creek and Jupiter Inlet)	9,000.00
Allotments from emergency river and harbor appropriation of March 2, 1907 (between Goat Creek and Jupiter Inlet, April 8, 1908, $5,000; May 26, 1908, $5,000)	10,000.00
Total	90,014.62

P 7.

IMPROVEMENT OF BISCAYNE BAY, FLORIDA.

No work has been done by the Florida East Coast Railway Company during the fiscal year under its contract to dredge a basin and a channel across the bay at its own expense, the work at the entrance

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not having progressed sufficiently to make further work to be done by them of any material advantage as yet.

Neither was any work done during the year under the contract with P. Sanford Ross (Incorporated) for dredging and rock removal at the entrance, the jetty work not having proceeded far enough to warrant a resumption of this work, which had been suspended by supplemental agreement until conditions for work should be more favorable.

Under date of September 25, 1907, a contract was made with R. G. Ross, of Jacksonville, Fla., for building the south jetty and extending the north jetty at the entrance. Work under this contract commenced December 3, 1907. At the end of the fiscal year 20,726.3 cubic yards of local limestone for hearting had been placed in the south jetty and 13,718.5 cubic yards in the north jetty, a total of 34,444.8 cubic yards. At the contract price, $2.20 per cubic yard, the cost was $75,778.56. Including incidentals the cost was $80,303.63, or $2.33 per cubic yard.

After the deposit of about 1,500 cubic yards more of soft rock the jetties will be ready for the granite capping.

Under the influence of the jetties the littoral drift of the sand has been checked and that which had accumulated in the dredged channel and on its prolongation has begun to scour.

For further information, see current summary page 353.

Money statement.

July 1, 1907, balance unexpended	$202,115.67
Amount appropriated by sundry civil act approved May 27, 1908	119,000.00
	321,115.67
June 30, 1908, amount expended during fiscal year for works of improvement	55,535.05
July 1, 1908, balance unexpended	265,580.62
July 1, 1908, outstanding liabilities	37,528.09
July 1, 1908, balance available	228,052.53
July 1, 1908, amount covered by uncompleted contracts	129,808.91
Amount (estimated) required for completion of existing project	27,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	27,000.00

APPROPRIATIONS.

Act of June 13, 1902	$50,000.00
Act of March 3, 1903	250,000.00
Overpayment prior to July 1, 1905	.48
March 3, 1905, allotment from emergency appropriation on November 27, 1905	[a]10,000.00
March 2, 1907	[b]100,000.00
May 27, 1908	119,000.00
Total	529,008.48

[a] Returned to Treasury, $240.83.

[b] And continuing contract for $146,000 additional.

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CONTRACTS IN FORCE.

Contractor: P. Sanford Ross (Incorporated).
Amount and character of material: Dredging—about 154,000 cubic yards sand; 92,000 cubic yards rock.
Construction of breakwater: About 4,500 tons hard rock; about 17,000 cubic yards coral rock.
Price: Rock removed, $1.78 per cubic yard; sand, 24 cents per cubic yard; hard rock for breakwater, $5.50 per ton; coral rock, $2.50 per cubic yard.
Date of approval: January 9, 1904.
Date of beginning work: March 14, 1904.
Date of expiration: March 14, 1906. (Work suspended by supplemental agreement.)

Contractor: Roderick G. Ross.
Amount and character of material: Stone for jetty hearting, 35,900 cubic yards; capping, 9,300 tons.
Price: Hearting, $2.20 per cubic yard; capping, $5 per ton.
Date of approval: October 1, 1907.
Date of beginning work: December 4, 1907.
Date of expiration: April 4, 1909.

COMMERCIAL STATISTICS.

Commerce of Biscayne Bay during the year ending December 31, 1907.

[Furnished by the Board of Trade, Miami, Fla.]

Articles.	Gross tonnage.	Articles.	Gross tonnage.
Cement	60	Lumber, yellow pine	20,000
Coal	240	Merchandise	23,000
Cross-ties	70	Oil and gasoline	60
Fertilizers	6,200	Oranges and grape fruit	340
Fish and oysters	4,100	Pineapples	3,700
Flour	200	Railroad supplies	40,000
Fruits	210	Sash, doors, and blinds	150
Grain	800	Tobacco	650
Hay	5,500	Vegetables	800
Hides	170		
Live stock	260	Total	106,010

Arrivals and departures of vessels for the year ending December 31, 1907.

Kind of vessel.	Arrivals.		Departures.	
	Number.	Tons.	Number.	Tons.
Steamers	271	430,000	271	510,000
Sailing vessels	360	41,000	302	29,000
Yachts	107	.....	88	.....

Estimated percentage of total trade of neighborhood carried by water, 40.
Probable increase of trade were the improvement completed, 80 per cent.
Probable effect of the project on freight rates: To lower, and by having deeper harbor new lines will be established.
Transportation business established during 1907: None.
Transportation business abandoned during 1907: To Honduras.

P 8.

IMPROVEMENT OF HARBOR AT KEY WEST, FLORIDA, INCLUDING ENTRANCE THERETO.

The survey made for the purpose of obtaining information upon which to base a project for the expenditure of the funds appropriated for this improvement in the river and harbor act of March 2, 1907, was completed and mapped during the fall. The project was

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submitted to the Chief of Engineers January 8 and was approved January 13, 1908.

Of the funds available it is proposed to expend about $125,000 in raising the east jetty to mean high tide for such distance as that sum will permit, the work to be done, mainly along the midlength of the jetty, where it is now the lowest. The balance of the appropriation it is proposed to reserve for dredging, should that be found necessary.

Bids for doing this jetty work by contract were opened May 23, 1907. The lowest bidder was R. G. Ross, of Jacksonville, Fla., and the contract was awarded him at the price of $3.57 per ton of stone in place in the jetty.

The channel through the northwest entrance, dredged last year, has held its depth very well, there being at present an available depth of 15½ feet.

An act of Congress approved May 28, 1908, authorized the expenditure of $5,000 for the purpose of removing certain reefs from the main ship channel from the appropriation for improving this harbor. The project for the expenditure of the sum authorized was approved June 24, 1908. The obstructions consist of masses of coral growth locally known as "Coral heads." It is proposed to remove these obstructions by hired labor, the material necessary for the work being purchased and the floating plant hired in the usual manner. No work had been done at the end of the year.

For further information, see current summary, page 354.

Money statement.

July 1, 1907, balance unexpended	$199,043.67
June 30, 1908, amount expended during fiscal year for works of improvement	6,459.84
July 1, 1908, balance unexpended	192,583.83
July 1, 1908, outstanding liabilities	204.40
July 1, 1908, balance available	192,379.43
Amount (estimated) required for completion of existing project	Unknown.
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	50,000.00

APPROPRIATIONS.

August 2, 1882	$25,000.00
August 5, 1886 (survey)	2,500.00
August 11, 1888	25,000.00
September 19, 1890	40,000.00
July 13, 1892	75,000.00
August 18, 1894	80,000.00
June 3, 1896	80,000.00
March 3, 1899	25,000.00
Allotments (July 2, 1900, $5,000; July 3, 1901, $5,000) from emergency river and harbor act June 6, 1900	10,000.00
June 13, 1902 (rivers and harbors)	100,000.00
March 3, 1905	50,000.00
Received from sales	1.50
Received from other sources	51.97
March 2, 1907	200,000.00
Total	712,553.47

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COMMERCIAL STATISTICS.

Commerce of Key West, Fla., during the year ending December 31, 1907.

Articles.	Gross tonnage.	Articles.	Gross tonnage.
Bacon	398	Naval stores	100
Canned goods	50	Oil and gasoline	5
Cement	4,750	Oranges	300
Coal	24,472	Pineapples	500
Fertilizers	1,903	Phosphate	20,000
Fish and oysters	856	Railroad supplies	5,000
Flour	260	Sash, doors, and blinds	500
Fruits	755	Shingles	500
Grain	300	Shoes	10
Hay	250	Sirup, honey, etc	5
Livestock	10,118	Tobacco	1,225
Lumber:		Vegetables	595
Cypress	500		
Yellow pine	10,216	Total	189,158
Merchandise	105,590		

Arrivals and departures of vessels for the year ending December 31, 1907.

Kind of vessel.	Arrivals.		Departures.	
	Number.	Tons.	Number.	Tons.
Steamer	347	407,577	478	449,847
Sailing vessels	121	11,739	116	8,228

Estimated percentage of total trade of neighborhood carried by water, 100.

P 9.

IMPROVEMENT OF KISSIMMEE RIVER, FLORIDA.

For project, description, etc., see summary, page 355.

At the beginning of the fiscal year work was continued by the Government dredge and snag boat *Kissimmee*, constructing new bulkhead and repairing old bulkhead at the upper end of Southport Canal between Lake Tohopekaliga and Cypress Lake, dredging in Kissimmee Canal and River, removing rock near west Gardner, and dredging shoals, trimming overhanging trees, and removing snags in Istokpoga Creek.

During the fiscal year 276 feet of new bulkhead on the east side of Southport Canal was constructed, 186 feet of old bulkhead on the west side of the canal was repaired, and an old washout in the bulkhead on the west side of the canal was filled; the bulkhead at the upper end of Kissimmee Canal was repaired, and a fill made behind it; piling were pumped down across the old river channel at the lower end of Kissimmee Canal, and brush was cut and placed in front of the piling across the old river channel at lower end of the canal to turn the water down the new channel; the old bulkhead at north end of Kissimmee Canal was repaired and 36 feet of new bulkhead at north end of the canal was constructed; 237 cubic yards of rock was blasted and dragged into deep holes in Kissimmee River near west Gardner, and there was dredged in Kissimmee Canal

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17,634.3 cubic yards of soft material, resulting in the following channel, three cuts 3 feet deep, 60 feet wide, and 40 feet, 1,008 feet, and 930 feet long, respectively, and three cuts 3 feet deep, 30 feet wide, and 100 feet, 393 feet, and 509 feet long, respectively. There was removed from Kissimmee River 690 snags, 3,715 overhanging trees were trimmed, and 865.7 cubic yards of soft material dredged, resulting in the following channel: Four cuts 3 feet deep, 30 feet wide, and 140 feet, 40 feet, 30 feet, and 50 feet long, respectively. There was removed from Istokpoga Creek 84 snags, 104 overhanging trees were trimmed, and 1,608 cubic yards of soft material dredged, resulting in three cuts 3 feet deep, 25 feet wide, 455 feet, 305 feet, and 75 feet long, respectively. The dredge was placed in ordinary from July 11 to August 20, 1907, and from March 23, 1908, to end of the fiscal year, owing to low stage of water in Kissimmee River. From August 21 to 31 the crew was busy receiving and installing new boiler for dredge.

The money expended for new work was $5,769.69, and for maintenance was $2,401.54, which includes all engineering and contingent expenses. The cost of the various kinds of work was as follows: Building and repairing bulkhead, $1.83 per linear foot; blasting rock, 43.4 cents per cubic yard; trimming overhanging trees, 44.8 cents each; dredging, 22.6 cents per cubic yard, and removing snags, $1.30 each.

There was little commerce, because the steamboats made only a few trips on account of the low stage of the waterway.

No lines of transportation were established nor any abandoned. Commercial statistics for the year 1907 are not available.

Money statement.

July 1, 1907, balance unexpended	$10,956.61
June 30, 1908, amount expended during fiscal year for works of improvement	8,171.23
July 1, 1908, balance unexpended	2,785.38
July 1, 1908, outstanding liabilities	76.26
July 1, 1908, balance available	2,709.12
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 13, 1902	$8,000
March 3, 1905	7,000
March 2, 1907	12,221
Total	27,221

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P 10.

IMPROVEMENT OF ORANGE RIVER, CHARLOTTE HARBOR, AND CALOOSAHATCHEE RIVER, FLORIDA.

These improvements were consolidated by the river and harbor act of June 13, 1902.

The river and harbor act of March 2, 1907, appropriated $3,000 for maintenance of the improvements.

On April 24, 1907, the following allotment of funds was approved:

To Orange River	$1,000
To Caloosahatchee River	2,000
Total	3,000

(A) ORANGE RIVER.

For project, description, etc., see summary, page 356.

The following work was done under the project approved April 26, 1907: Sixty-seven snags and 6 cubic yards of rock were removed and 223 overhanging trees were trimmed. The work cost $1,000, which included engineering and contingent expenses. The average cost of removing snags was $2.902 each; removing rock, $9.26 per cubic yard; and for trimming overhanging trees, $3.36 each.

The work was done between stations 1.4 and 5 miles above the mouth of the river. A chartered stern-wheel steamer, rigged with a snagging outfit, was used for the work. Operations were commenced on July 21 and ceased on August 10, when the available funds were exhausted.

The volume of commerce decreased 36 per cent during the calendar year 1907. No lines of transportation were established nor any abandoned.

Money statement.

July 1, 1907, balance unexpended	$1,000
June 30, 1908, amount expended during fiscal year for maintenance of improvement	1,000
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	1,500

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 13, 1902 (allotted)	$2,000
March 3, 1905 (allotted)	1,000
March 2, 1907 (alotted)	1,000
Total	4,000

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COMMERCIAL STATISTICS.

Commerce of Orange River, Florida, for the year ending December 31, 1907.

[Furnished by Capt. J. F. Menge, Fort Myers, Fla.]

Articles.	Gross tonnage.	Value.
Bacon	2	$460.00
Canned goods	2	202.40
Crate material	210	6,300.00
Dry goods, hats, etc.	5	6,000.00
Fertilizers	189	6,615.00
Fish	120	9,600.00
Flour	6	330.00
Grain (all kinds)	88	3,080.00
Grits and meal	28	1,400.00
Groceries	9	3,017.88
Hardware	3	300.00
Hay	11	220.00
Miscellaneous packages	1,283	128,300.00
Nails	9	495.00
Oranges	1,310	60,587.00
Other fruits	383	44,680.78
Shingles	9	206.28
Vegetables	35	4,375.00
Ice	300	1,500.00
Total	4,002	277,669.34

Transportation lines established during 1907, none.
Transportation lines abandoned during 1907, none.
Number of steamboats in trade, two.
Number of sailing vessels in trade, none.

(B) CHARLOTTE HARBOR AND CALOOSAHATCHEE RIVER, FROM PUNTARASA TO PUNTA GORDA, FLA.

For project, description, etc., see Annual Report of the Chief of Engineers for 1903, page 282.

No work was done during the fiscal year, and no work is proposed.

No commercial statistics for the calendar year 1907 are available. No lines of transportation were established nor any abandoned.

APPROPRIATIONS.

CHARLOTTE HARBOR AND PEACE CREEK, FLORIDA.

September 19, 1890	$35,000
August 18, 1894	20,000
June 3, 1896	20,000
March 3, 1899	25,000
June 13, 1902 (allotted)	6,000
Total	106,000

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(c) CALOOSAHATCHEE RIVER, BETWEEN PUNTARASA AND FORT THOMPSON.

For project, description, etc., see summary, page 357. Nothing but work of maintenance was done during the fiscal year.

Under the project approved April 26, 1907, there were removed during the fiscal year 96 snags and 3 cubic yards of rock, and 161 overhanging trees were trimmed. The cost of the work was $1,632.66, which included engineering and contingent expenses. The average cost of removing snags was $6.78 each; removing rock, $4.25 per cubic yard, and for trimming overhanging trees, $6.02 each.

The work was done between stations 40 and 58 miles above the mouth of the river. A chartered stern-wheel steamer, rigged with a snagging outfit, was used for the work. Operations were commenced July 1 and ceased July 19, owing to exhaustion of available funds.

No work was done under the allotment dated May 12, 1908, of $3,000, because a plant suitable for doing the work could not be brought to the locality before the end of the fiscal year.

The volume of commerce decreased 80 per cent during the calendar year 1907.

Money statement.

July 1, 1907, balance unexpended	$1,663.90
Allotted from emergency appropriation, river and harbor act of March 2, 1907	3,000.00
	4,663.90
June 30, 1908, amount expended during fiscal year for maintenance of improvement	1,632.66
July 1, 1908, balance unexpended	3,031.24
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	8,500.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

August 2, 1882	$5,000
July 5, 1884	5,000
August 5, 1886	4,000
August 11, 1888	10,000
September 19, 1890	3,600
July 13, 1892	1,000
August 18, 1894	2,000
June 3, 1896	1,000
March 3, 1899	2,000
June 13, 1902 (allotted)	1,500
March 3, 1905 (allotted)	2,000
February 24, 1906, allotted from emergency appropriation, river and harbor act of March 3, 1905	2,000
March 2, 1907 (allotted)	2,000
May 12, 1908, allotted from emergency appropriation, river and harbor act of March 2, 1907	3,000
Total	44,100

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COMMERCIAL STATISTICS.

Commerce of Caloosahatchee River, Florida, for the year ending December 31, 1907.

[Furnished by Capt. J. F. Menge, Fort Myers, Fla.]

Articles.	Gross tonnage.	Value.
Bacon	18	$4,140.00
Canned goods	17	1,720.40
Cattle	13	780.00
Cement	3	31.50
Crate material	240	7,200.00
Dry goods, hats, etc.	11	13,200.00
Fertilizers	690	24,150.00
Flour	57	3,135.00
Grain (all kinds)	544	19,040.00
Groceries	18	6,035.75
Hardware	4	400.00
Hay	116	2,320.00
Hides and skins	5	425.00
Lumber, yellow pine	158	948.00
Meats (smoked, etc.)	25	6,250.00
Nails	11	605.00
Oranges	1,885	57,181.25
Other fruits	589	68,712.74
Shingles	31	710.52
Sugar	32	8,304.00
Total	4,467	250,289.17

Transportation lines established during 1907, none.
Transportation lines abandoned during 1907, none.

P 11.

IMPROVEMENT OF SARASOTA BAY, FLORIDA.

For description, project, etc., see summary, page 358.

At the beginning of the fiscal year dredging operations were in progress with Government dredge *Suwanee* in Little Sarasota Bay, near Blackburns Point, under the appropriation of river and harbor act of March 2, 1907. Work was continued there until April 10, 1908, when operations ceased, owing to exhaustion of available funds.

During the fiscal year there was removed a total of 61,131 cubic yards of soft material and 449.4 cubic yards of rock. Result of the work is 17 cuts with mean low-water depths varying from 4.5 to 5.5 feet, widths varying from 50 to 75 feet, and lengths varying from 35 to 1,515 feet.

During the fiscal year there was expended a total of $18,730.83, which included contingent expenses and all repairs to the *Suwanee* to the time work ceased there. Of the foregoing amount $17,368.31 was expended for new work and $1,362.52 for maintenance. The average cost for removing rock was $2.425 per cubic yard and for dredging soft material 30.2 cents per cubic yard.

The volume of commerce increased 11 per cent during the calendar year 1907. No lines of transportation were established nor any abandoned.

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Money statement.

July 1, 1907, balance unexpended	[a]$18,738.83
June 30, 1908, amount expended during fiscal year for works of improvement	18,730.83
July 1, 1908, balance unexpended	7.50
Amount (estimated) required for completion of existing project	25,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement $25,000.00	
For maintenance of improvement 5,000.00	30,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

September 19, 1890	$5,000.00
July 13, 1892	2,500.00
August 18, 1894	2,500.00
June 3, 1896	2,500.00
March 3, 1899	5,000.00
June 13, 1902	5,000.00
March 3, 1905	5,000.00
January 27, 1906, allotted from emergency appropriation, river and harbor act of March 3, 1905	5,000.00
Sale of old material	42.75
March 2, 1907	22,500.00
Total	55,042.75

COMMERCIAL STATISTICS.

Commerce of Sarasota Bay, Florida, for the year ending December 31, 1907.

[Furnished by Mr. Harry L. Higel, Sarasota, Fla.]

Articles.	Gross tonnage.	Value.
Bacon	135	$31,050.00
Canned goods	350	35,420.00
Cement	250	2,625.00
Coal	20	110.00
Fertilizers	1,000	35,000.00
Fish	350	28,000.00
Flour	588	32,340.00
Grain (all kinds)	7,000	245,000.00
Grape fruit	135	15,749.10
Hay	150	3,000.00
Hides	8	680.00
Lumber, cypress	18	360.00
Lumber, yellow pine	625	3,750.00
Merchandise	600	60,000.00
Oil and gasoline	225	6,750.00
Oranges	600	27,750.00
Oysters	420	19,500.00
Resin	275	8,888.50
Sash, doors, and blinds	300	18,000.00
Shingles	72	1,650.24
Shoes	6	5,400.00
Sirup, honey, etc	20	1,500.00
Turpentine	43	4,197.66
Vegetables	160	20,000.00
Total	13,350	606,670.50

[a] Balance unexpended, $18,736.33, as shown by Annual Report for 1907, should read $18,738.33.

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About 75 per cent of the local trade between Sarasota and Tampa is carried by water.

The channel improvement has caused citrus fruits, vegetables, and naval stores to be shipped from the shores of Little Sarasota Bay to the town of Sarasota.

P 12.

IMPROVEMENT OF MANATEE RIVER, FLORIDA.

For description, project, etc., see summary, page 360, and Report of the Chief of Engineers for 1905, page 1317.

The river and harbor act of March 2, 1907, appropriated $70,710 for completing the improvement and for maintenance of Manatee River.

Project for expenditure of available funds was approved on April 13, 1907. It is proposed to obtain a channel 100 feet wide and 9 feet deep at mean low water from McNeills Point to Rocky Bluff, for maintenance of a channel 75 feet wide and 4 feet deep from Rocky Bluff to Rye, and for maintenance of a cut 100 feet wide and 6 feet deep from Manatee River to Terraceia Bay, the work to be done by hired labor, using Government plant.

The Government dredge *Suwanee* commenced maintenance operations between Rocky Bluff and Rye on April 27, 1908, and continued until June 2, 1908, when operations ceased. The following work was accomplished: One hundred and twenty-two snags were removed, 129 overhanging trees trimmed, and there was dredged 7,664 cubic yards of soft material. The total field cost of the work was $2,144.92, or $3.30 each for snagging, $2.45 each for trimming trees, and 18.61 cents per cubic yard for dredging. In addition to the field cost of the work there was spent $4,480.39 for contingencies and repairs to Government dredges.

No commercial statistics for the year 1907 are available.

No new line of steamers was established. One line was abandoned.

Money statement.

July 1, 1907, balance unexpended	$68,889.76
June 30, 1908, amount expended during fiscal year for works of improvement	6,625.31
July 1, 1908, balance unexpended	62,264.45
July 1, 1908, outstanding liabilities	766.00
July 1, 1908, balance available	61,498.45
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

August 2, 1882	$12,000.00
August 5, 1886	11,000.00
August 11, 1888	5,000.00
September 19, 1890	6,000.00
July 13, 1892	6,000.00
August 18, 1894	3,000.00
June 3, 1896 ($3,000 for Terracela Cut-off)	4,000.00
March 3, 1899 ($8,000 for Terracela Cut-off)	10,000.00
June 13, 1902 (allotted for Terracela Cut-off)	2,342.00
March 3, 1905	10,000.00
Sale of old material	8.80
March 2, 1907	70,710.00
Total	140,060.80

P 13.

IMPROVEMENT OF TAMPA BAY, FLORIDA.

For description, project, and results, see summary, page 361.

The river and harbor act of March 3, 1905, authorized expenditure of balance of funds remaining in securing a channel depth of 26 feet, provided that the owners of the docks, wharves, and terminals at Tampa Bay shall, by valid contract, agree to submit the wharfage charges to the Secretary of War for his approval. The schedule of the terminal company was approved on October 26, 1906.

Project for expenditure of available funds was approved by the Secretary of War on December 15, 1906. It is proposed to do half of the work (sections A and B and the lower part of section D) by hired labor, using the U. S. dredges *Key West* and *St. Johns*. The other half of the work (upper part of section D and sections E, F, G, H, J, and K) is to be done by contract, inviting bids in the usual way.

On August 16, 1907, bids were opened for that half of the work to be done by contract. On October 2, 1907, the Chief of Engineers approved the contract entered into on September 10, 1907, with the Bowers Southern Dredging Company, Galveston, Tex. The price for dredging is 26 cents per cubic yard.

The Government dredge *Key West* was at work at the beginning of the fiscal year and continued operations until July 17, 1907. The dredge left for Jacksonville, Fla., on July 18 to undergo repairs, and did not return to the field of operations until September 13, 1907, when work was resumed and continued until February 21, 1908, when the dredge was ordered to the harbor of Key West, Fla. The dredge removed during the fiscal year 19,047 cubic yards of soft material from the cut across the bar and 182,718 cubic yards from the cuts in the lower bay. The total field cost of the work was $32,663.69, or 24.21 cents per cubic yard for the work on the bar and 15.3 cents per cubic yard of the work in the bay. The total cost of the work was $42,682.42, the difference between it and the field cost consisting of repairs to the Government dredge *Key West*, that should be distributed over a long period of time, or for items that were not used on the Tampa Bay work, consisting of the following: Extraordinary repairs

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to dredge at Jacksonville, July–September, 1907, $9,151.28; extension swivel, $735.53; quadrant for distributing valve, $4.68, and pattern and fittings for new swivel elbow, $127.24.

The Government dredge *St. Johns* commenced work on August 31, 1907, and continued operations until February 5, 1908, when she was ordered to Jacksonville, Fla. The dredge removed from the cut across the bar 137,181 cubic yards of soft material and from the cuts in the bay 47,025 cubic yards. The total field cost of the work was $48,134.42, or 28.77 cents per cubic yard for the work on the bar and 18.44 cents per cubic yard for work in the bay. The total cost of the work was $61,371.93, the difference between it and the field cost of the work consisting of repairs to the Government dredge *St. Johns*, which should be distributed over a long period of time, or for items that were not used on the Tampa Bay work, consisting of the following: Extraordinary repairs and new pump liners, $11,897.51; new suction pipe, $1,092, and new pump fittings, $248.

The contractor began operations on December 19, 1907, and at the end of the fiscal year had removed 156,119 cubic yards of soft material. The total cost, including contingencies, was $31,497.37.

No transportation lines were established and none abandoned.

The volume of commerce shows an increase over the last calendar year of 5 per cent.

Money statement.

July 1, 1907, balance unexpended	$229,200.18
Receipts from sales	10.75
	229,210.93
June 30, 1908, amount expended during fiscal year for works of improvement	135,551.72
July 1, 1908, balance unexpended	93,659.21
July 1, 1908, outstanding liabilities	16,782.79
July 1, 1908, balance available	76,876.42
July 1, 1908, amount covered by uncompleted contracts	72,481.50
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	25,000.00

APPROPRIATIONS.

Under previous projects—	
June 14, 1880	$10,000.00
March 3, 1881	10,000.00
August 2, 1882	20,000.00
July 5, 1884	20,000.00
August 5, 1886	10,000.00
August 11, 1888	25,000.00
September 19, 1890	25,000.00
July 13, 1892	10,000.00
Total	130,000.00

Under present project—	
March 3, 1899	$75,000.00
June 6, 1900	135,000.00
March 3, 1901	127,000.00
June 28, 1902	86,675.00
March 3, 1903	186,337.76
Receipts from sales of blueprints	8.50
Receipts from sales of old property	8.20
Total	610,024.46

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CONTRACT IN FORCE.

Contractor: Bowers Southern Dredging Company.
Amount and character of material: Dredging about 445,000 cubic yards of sand and mud.
Price: $0.26 per cubic yard.
Date of approval: October 2, 1907.
Date of beginning work: December 4, 1907.
Date of expiration: July 4, 1908.

COMMERCIAL STATISTICS.

Commerce of Tampa Bay, Florida, for the year ending December 31, 1907.

[Furnished by J. W. Morris, general forwarding agent, Port Tampa, Fla.]

Articles.	Gross tonnage.	Value.
Bacon, salt	125	$28,290.00
Canned goods	4,250	480,100.00
Cement	2,012	21,126.00
Coal	66,350	364,925.00
Eggs	1,804	432,960.00
Fertilizers	428	14,980.00
Flour	785	43,175.00
Fruits (mangoes)	97	6,466.00
Grain (all kinds)	910	81,850.00
Grape fruit and oranges	3	180.75
Hay	362	7,240.00
Live stock (cattle)	17	1,020.00
Lumber, cypress	2,400	48,000.00
Lumber, yellow pine	16,000	96,000.00
Oil and gasoline	74,184	2,299,704.00
Pineapples	10	666.70
Phosphate	697,900	3,601,164.00
Resin	12,005	336,840.70
Sash, doors, etc	5	300.00
Shingles	22	504.24
Shoes	42	87,800.00
Sirup, honey, etc	7	525.00
Tobacco (boxes)	2	2,200.00
Tobacco (bales)	2,322	4,179,600.00
Turpentine	3,148	307,307.76
Vegetables	14	1,750.00
Total	885,204	12,343,675.15

Arrival and departure of vessels for the year ending December 31, 1907.

Kind of vessel.	Arrivals.		Departures.	
	Number.	Tons.	Number.	Tons.
Steamers	366	136,460	366	652,754
Sailing vessels	126	66,350	126	118,000

Number of passengers carried, 25,512.
Transportation business established during 1907, none.
Transportation business abandoned, none.

P 14.

IMPROVEMENT OF HILLSBORO BAY, FLORIDA.

For description, projects, and results, see summary, page 362.

At the beginning of the fiscal year dredging operations were in progress under contract entered into on July 26, 1905, with George W. Catt. The contract was completed on February 29, 1908.

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On September 24, 1907, supplemental agreement was entered into with the estate of George W. Catt, modifying the contract entered into on July 26, 1905, to the effect that operations under the original contract would cease upon the completion of the dredging of the soft material without prejudice to either party, and that all obligations between the parties of the first and second part shall be accomplished upon removal of the soft material and payment therefor.

Supplemental agreement was entered into with the estate of George W. Catt on November 25, 1907, for depositing material handled by the contractor's hydraulic dredge at a minimum distance of 1,200 feet from the edge of the channel at a price of 12 cents per cubic yard.

Under the original contract there was removed 383,230 cubic yards of soft material, at the contract price of 14 cents per cubic yard. The total cost, including contingencies, was $82,300.29. Under the supplemental agreement dated November 25, 1907, there was removed 156,046 cubic yards of soft material, at the contract price of 12 cents per cubic yard. The total cost, including contingencies, was $28,724.19. Result of the work is a channel 20 feet deep at mean low water and 150 feet wide from the lower bay to the mouth of Hillsboro River, with a turning basin at inner end of the channel 450 feet wide and 1,050 feet long, with a depth of 20 feet, excepting in its northwesterly end, where the depth is 16.8 feet at mean low water.

The volume of commerce on Hillsboro Bay increased 16 per cent during the year 1907.

Three lines of steamers were established—one between Tampa and Cuban ports, one between Tampa and New Orleans, and one between Tampa and New York and Mobile. A steamer line between Tampa and St. Petersburg, Fla., was abandoned.

Money statement.

July 1, 1907, balance unexpended	$148,377.59
Receipts from sales, $20.24; monuments at Gasparilla Island, $175.15	195.39
	148,572.98
June 30, 1908, amount expended during fiscal year for works of improvement	111,024.48
July 1, 1908, balance unexpended	37,548.50
July 1, 1908, outstanding liabilities	500.00
July 1, 1908, balance available	37,048.50
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

A list of appropriations made for previous projects in this locality is given in the report for the improvement of Tampa Bay in the Annual Report of the Chief of Engineers for 1899, page 1634.

Project adopted March 3, 1899:	
March 3, 1899	$125,000.00
June 13, 1902	150,000.00
Total	275,000.00

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Project adopted March 3, 1905:	
March 3, 1905	$100,000.00
June 30, 1906, sundry civil act	348,350.00
Sale of old material	9.30
Overpayments prior to fiscal year 1905	5.44
Receipts from sales	6.15
Overpayment on voucher	16.99
Received from Marine-Hospital Service	175.15
Total	448,563.03

CONTRACTS IN FORCE.

Contractor: Estate of George W. Catt.
Work: Dredging and rock removal.
Date: July 26, 1905.
Approved: August 21, 1905.
Date of beginning: October 4, 1905.
Date of completion: February 29, 1908.
Quantities: Three thousand three hundred cubic yards of rock at $4.90 per cubic yard; 2,315,000 cubic yards of sand, mud, etc., at 14 cents per cubic yard.

COMMERCIAL STATISTICS.

Commerce of Hillsboro Bay, Florida, during the year ending December 31, 1907.

[Furnished by J. D. Calhoun, secretary board of trade, Tampa, Fla.]

Articles.	Gross tonnage.	Value.
Artificial stone	1,494	$9,292.68
Bacon, salt	2,849	163,760.00
Bananas	2,282	182,560.00
Brick	10,812	43,248.00
Canned goods	15,712	1,590,054.40
Cement	12,540	181,670.00
Cigars	158	1,896,000.00
Coal	29,625	162,937.50
Cocoanuts	6	200.00
Crate material	2,545	76,350.00
Cross-ties	11,500	57,500.00
Crude petroleum	5,450	35,425.00
Drugs and supplies	335	536,000.00
Dry goods, hats, etc	281	337,200.00
Fertilizers	35,700	1,249,500.00
Fish	13,250	1,060,000.00
Flour	5,531	304,205.00
Fuller's earth	21,644	309,076.32
Furniture	95	19,000.00
Gasoline and light oil	1,705	51,150.00
Grain	94,325	3,301,375.00
Hardware, miscellaneous	1,207	120,700.00
Hay	13,838	276,760.00
Hides and skins	48	4,080.00
Ice	7,390	36,950.00
Logs, cedar and pine	42,010	50,412.00
Lumber, cypress	4,200	84,000.00
Lumber, pine	78,450	472,500.00
Meats, smoked, etc	229	57,250.00
Miscellaneous merchandise	15,800	1,580,000.00
Nails	1,251	68,805.00
Naval stores	2,194	142,346.72
Oil, machine	112	8,584.00
Oranges	12,425	574,656.25
Other fruits	2,280	265,984.80
Oysters	430	19,964.90
Phosphate, pebble, for paving, etc	28,948	130,266.00
Salt	1,553	17,083.00
Sand, for artificial stone	9,062	9,062.00
Shingles	3,319	76,071.48
Sugar	4,956	511,707.00

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Commerce of Hillsboro Bay, Florida, etc.—Continued.

Articles.	Gross tonnage.	Value.
Tobacco, boxes	33	$36,300.00
Tobacco, bales	590	1,062,000.00
Tropical fruits	1,178	78,525.48
Vegetables	6,525	815,625.00
Waters, mineral, etc	387	38,700.00
Wines and liquors	575	230,000.00
Wood	18,800	45,954.00
Total	520,629	18,825,791.53

Arrivals and departures of vessels for the year ending December 31, 1907.

Kind of vessel.	Arrivals.	Departures.
Steamers	2,614	2,615
Sailing vessels	850	847

Number of passengers carried, 65,400.
Number of steamers in trade, 27.
Number of sailing vessels in trade, 85.
Transportation lines established, three.
Transportation lines abandoned, one (small, local).

P 15.

IMPROVEMENT OF CRYSTAL, ANCLOTE, AND SUWANEE RIVERS, FLORIDA.

The river and harbor act of March 2, 1907, appropriated $25,000 for continuing improvement and for maintenance of Crystal, Anclote, and Suwanee rivers, Florida.

On May 8, 1907, the Secretary of War made the following, allotments from available funds, the appropriation of March 2, 1907, and the balance remaining from the appropriation of March 3, 1905:

To Crystal River	$3,268.31
To Anclote River	17,000.00
To Suwanee River	8,000.00
Total	28,268.31

(A) CRYSTAL RIVER.

For description, project, and survey report, see summary, page 363, and Report of the Chief of Engineers for 1900, pages 2075–2084.

Project for expenditure of available funds was approved on May 11, 1907. It is proposed to maintain the channel by dredging, the work to be done by hired labor, using Government dredge.

No work was done during the year, the money expended being for contingencies.

The volume of commerce on Crystal River decreased 5 per cent during the year 1907. One line of transportation was abandoned, and none established.

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Money statement.

July 1, 1907, balance unexpended	$2,506.72
June 30, 1908, amount expended during fiscal year for works of improvement	776.67
July 1, 1908, balance unexpended	1,730.05

APPROPRIATIONS.

June 13, 1902 (allotted)	$10,000.00
March 3, 1905 (allotted)	15,000.00
Rent of dredge *Florida* (October, 1906)	206.72
Total	25,206.72

COMMERCIAL STATISTICS.

Commerce of Crystal River, Florida, for the year ending December 31, 1907.

[Furnished by Mr. C. E. Herrick, Crystal River, Fla.]

Articles.	Gross tonnage.	Value.
Fiber, palmetto	100	$6,700.00
Fish and oysters	425	28,122.25
General merchandise	63	6,800.00
Lumber, cedar	4,800	204,720.00
Lumber, pine	2,500	15,000.00
Total	7,888	260,842.25

Number of steamboats in trade, 2.
Transportation lines established during 1907, none.
Transportation lines abandoned during 1907, none.

(B) ANCLOTE RIVER.

For description, project, and results, see summary, page 364, and Report of the Chief of Engineers for 1898, pages 1361–1363.

Project for expenditure of available funds was approved May 11, 1907. It is proposed to complete the channel to the width contemplated under the project, so far as this is possible, and to maintenance work; the work to be done by hired labor, using Government dredge.

No work was done during the fiscal year, the money expended being for repairs to the dredge *Florida*. No statistics are available for 1907.

Money statement.

July 1, 1907, balance unexpended	$17,000.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	654.06
July 1, 1908, balance unexpended	16,345.94

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Amount (estimated) required for completion of existing project	$14,500.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908, for works of improvement. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	14,500.00

APPROPRIATIONS.

March 3, 1899	$5,000
June 13, 1902 (allotted)	10,000
March 3, 1905 (allotted)	5,000
March 2, 1907 (allotted)	17,000
Total	37,000

(c) SUWANEE RIVER.

For description, project, and results, see summary, page 365, and Report of the Chief of Engineers for 1906, page 1232.

Project for expenditure of the available funds was approved May 11, 1907. It proposes to widen the channel to 100 feet from the Gulf of Mexico to a point one-half mile above the river's mouth, the work to be done by hired labor using Government dredge.

No work was done during the fiscal year, the money expended being for contingencies.

No lines of transportation were established or any abandoned.

Money statement.

July 1, 1907, balance unexpended	$7,900.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	825.20
July 1, 1908, balance unexpended	7,074.80
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	5,000.00

APPROPRIATIONS.

June 14, 1880	$5,000.00	June 3, 1896	$3,000.00
March 3, 1881	3,000.00	March 3, 1899	5,000.00
August 2, 1882	5,000.00	June 13, 1902 (allotted)	7,658.00
July 5, 1884	5,000.00	March 3, 1905 (allotted)	5,000.00
August 5, 1886	5,000.00	For rent of dredge	78.90
August 11, 1888	15,000.00	March 2, 1907 (allotted)	8,000.00
September 19, 1890	3,000.00		
July 13, 1892	3,000.00	Total	75,736.90
August 18, 1894	3,000.00		

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COMMERCIAL STATISTICS.

Commerce of Suwanee River, Florida, for the year ending December 31, 1907.

[Furnished by W. M. George, postmaster, Branford, Fla.]

Articles.	Gross tonnage.	Value.
Cedar cases	478	$44,382.80
Cross-ties	15,550	77,750.00
Empty turpentine barrels	175	9,332.75
Fertilizers	81	2,835.00
Fish	2	160.00
Grain (of all kinds)	1,992	69,720.00
Hay	171	8,420.00
Honey, sirup, etc	5	375.00
Lumber, all kinds	1,963	11,778.00
Merchandise	1,647	164,700.00
Resin	2,738	87,999.32
Turpentine	903	88,150.86
Total	25,705	560,603.23

Transportation lines established during 1907	0
Transportation lines abandoned during 1907	0
Number of steamboats in trade	4
Number of sailing vessels in trade	1

P 16.

IMPROVEMENT OF WITHLACOOCHEE RIVER, FLORIDA.

For description, survey, etc., see summary, page 366.

Project for expenditure of available funds was approved April 25, 1907.

On October 10, 1907, bids were opened for the work to be done, and on January 22, 1908, the Chief of Engineers approved the contract entered into on December 30, 1907, with the Southern Dredging Company, Mobile, Ala., the price being 19½ cents per cubic yard for dredging soft material and $3 per cubic yard for removal of rock the funds appropriated for completion of the work to be applied to dredge a channel 10 feet deep at mean low water and 85 feet wide from Port Inglis to the anchorage in the Gulf of Mexico. The contractor began operations on April 11, 1908, and at end of the fiscal year had removed 32,837 cubic yards of soft material. The total cost, including contingencies, was $1,189.69. Result of the work is: One cut 2,786.5 feet long, from 45 to 85 feet wide, and varying from 8 to 11 feet deep at mean low water; and four cuts 85 feet wide, and of the following lengths and mean low-water depths: One cut 200 feet long and 10 feet deep; one cut 1,057 feet long, and varying in depth from 8.2 to 11 feet; one cut 1,854 feet long, and varying in depth from 6.5 to 11 feet; and one cut 508 feet long, and varying in depth from 8.1 to 11 feet.

The volume of commerce on Withlacoochee River increased 14 per cent during the year ending December 31, 1907.

No lines of transportation were established or any abandoned.

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Money statement.

July 1, 1907, balance unexpended	$65, 4(
Amount appropriated by sundry civil act approved May 27, 1908	100, 0(
	165, 4(
June 30, 1908, amount expended during fiscal year for works of improvement	1, 1(
July 1, 1908, balance unexpended	164, 21
July 1, 1908, outstanding liabilities	7, 66
July 1, 1908, balance available	156, 54
July 1, 1908, amount covered by uncompleted contracts	188, 44
Amount (estimated) required for completion of existing project	50, 00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	50, 00(
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATIONS.

March 3, 1881	$7, 500. 00	March 3, 1905 (allotted)	$15, 000
July 5, 1884	3, 000. 00	Overpayment on voucher fiscal year 1905	
August 5, 1886	3, 000. 00	March 2, 1907	65, 400
August 11, 1888	5, 000. 00	May 27, 1908	100, 000
September 19, 1890	5, 400. 00		
August 18, 1894	800. 00		
June 13, 1902	15, 000. 00	Total	225, 100
June 13, 1902 (allotted)	5, 000. 00		

CONTRACT IN FORCE.

Contractor: Southern Dredging Company.
Amount and character of material: Dredging 170,000 cubic yards of s material; 64,700 cubic yards of rock.
Prices: Soft material, $0.195 per cubic yard; rock, $3 per cubic yard.
Date of approval: January 22, 1908.
Date of beginning work: March 28, 1908.
Date of expiration: July 28, 1909.

COMMERCIAL STATISTICS.

Commerce of Withlacoochee River, Fla., for the year ending December 31, 19

[Furnished by A. G. Bigelow, manager Dunnellon Phosphate Company, Rockwell, Fla.]

Articles.	Gross tonnage.	Value.	Articles.	Gross tonnage.	Value.
Bacon, salt	27	$6, 210. 00	Merchandise	945	$94, 500.
Canned goods	33	3, 339. 60	Oil and gasoline	386	10, 080.
Cement	4	42. 00	Phosphate	189, 337	1, 693, 896.
Coal	1, 327	7, 296. 50	Shingles	155	3, 552.
Fertilizers	5, 662	198, 170. 00	Shoes	5	4, 500.
Fish and oysters	17	1, 124. 89	Sirup, honey, etc	33	2, 475.
Flour	39	2, 145. 00	Tobacco	1	1, 100.
Grain (all kinds)	11	385. 00	Vegetables	22	2, 750.
Iron pyrites	3, 812	15, 286. 12	Total	206, 509	2, 070, 802.
Lumber, yellow pine	4, 743	28, 458. 00			

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Arrival and departure of vessels for the year ending December 31, 1907.

Kind of vessel.	Arrivals.		Departures.	
	Number.	Tons.	Number.	Tons.
Steamers	66	3,812	66	189,549
Sailing vessels	11	3,627	11	9,244
Yachts	22	.....	22	.....

Number of passengers carried, 2,007.
Transportation lines established during 1907, none.
Transportation lines abandoned during 1907, none.
The channel improvement has made possible all the commerce, for there was no commerce prior to 1902 when the channel was opened at the expense of the Port Inglis Terminal Company.

P 17.

REMOVING THE WATER HYACINTH FROM FLORIDA WATERS.

Work during the fiscal year was confined to Peters Creek, Trout Creek and Six Mile Creek, and Oklawaha River, all tributaries of the St. Johns River at points 22, 29, 30, and 77 miles, respectively, above Jacksonville.

An examination of Peters Creek was made October 30, and the stream was found to be badly obstructed by hyacinths. The work of removing the obstruction began November 25 and was completed December 10, 1907. An area of about 121,300 square yards, or 25 acres, of the plants was drifted out of the steam.

An examination of Trout Creek and Six Mile Creek was made December 5. The work of removing the obstructions from these streams was begun December 19 and was completed December 24, 1907. An area of about 205,000 square yards, or about 43 acres, of the plants was removed.

The clearing of these streams permitted the resumption of the work of getting out saw logs and railway ties, which had entirely ceased owing to the obstruction caused by the water hyacinth.

A stretch of about 3 miles of the Oklawaha River from 53 to 56 miles above the mouth having been completely obstructed by the water hyacinth was cleared by hand with small boats. About 107,360 square yards, or a little over 22 acres, of the plants were removed.

By authority of the Chief of Engineers the steamer *Le Reve* was renamed *Captain Maguire*. On July 27 the boat was loaned to the Savannah, Ga., district for use on survey work. It returned to Jacksonville September 28, 1907, was hauled out and repaired and a hoisting engine and derrick were installed. The boat was used on the survey of the St. Johns River from Palatka to Lake Harney from November 16, 1907, to April 10, 1908. It left for Indian River on June 23 for use on the survey of St. Lucie Inlet.

The total cost of the work done during the fiscal year was $6,922.36.

For further information, see current summary, page 367.

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Money statement.

July 1, 1907, balance unexpended	$24,671.
Receipts from sales, $97.50; rent of steamer "Capt. Maguire," $311.30	408.
	25,080.
June 30, 1908, amount expended during fiscal year, for works of improvement	6,922.
July 1, 1908, balance unexpended	18,158.
Amount (estimated) required for completion of existing project	Indefinit
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement in addition to the balance unexpended July 1, 1908	10,000.

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

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APPENDIX Q.

IMPROVEMENT OF RIVERS AND HARBORS IN THE MONTGOMERY, ALABAMA, DISTRICT.

REPORT OF CAPT. H. B. FERGUSON, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Carrabelle Bar and Harbor, Florida.
2. Apalachicola Bay, Florida.
3. Apalachicola River, the Cut-off, and Chipola River, Florida.
4. Flint River, Georgia.
5. Chattahoochee River, Georgia and Alabama.
6. Choctawhatchee River, Florida and Alabama.
7. Holmes River, Florida, from Vernon to its mouth.
8. Blackwater River, Florida.
9. Pensacola Harbor, Florida.
10. Escambia and Conecuh rivers, Florida and Alabama.
11. Alabama River, Alabama.
12. Coosa, Oostenaula, and Coosawattee rivers, Georgia and Alabama.
13. Operating and care of canals and other works of navigation on Coosa River, Georgia and Alabama.
14. Removing sunken vessels or craft obstructing or endangering navigation.

UNITED STATES ENGINEER OFFICE,
Montgomery, Ala., July 16, 1908.

SIR: I have the honor to forward herewith * * * annual report * * * of the river and harbor works under my charge for the fiscal year ended June 30, 1908.

Very respectfully,

H. B. FERGUSON,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

Q 1.

IMPROVEMENT OF EAST PASS AND CARRABELLE BAR AND HARBOR, FLORIDA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Under the project of March 2, 1907, contract was entered into with Mr. J. F. Taylor, of Pensacola, Fla., on August 29, 1907, for dredging 250,000 cubic yards at 17½ cents per cubic yard. Work was begun at the wharves at Carrabelle in November, 1907, and on June 30, 1908, the channel 100 feet wide and 10 feet deep had been

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dredged for a distance of 5,130 feet, to near the beginning of the 18-foot cut; 83,026 cubic yards of material were removed.

RECOMMENDATIONS.

The completion of the present dredging contract and the wharves alongside the turning basin will give this harbor fair facilities for its export lumber trade and coastwise commerce. An increased depth of water through East Pass would secure much better rates of freight and insurance for the commerce now using Carrabelle Harbor, and much better inducements would be afforded to prospective commerce. Therefore the funds necessary for completing this part of the approved project should be provided. Of the estimate for maintenance $20,000 is to be applied as one-fourth the cost of a hydraulic dredge, the remaining portion of its cost to be provided for under the estimates for maintenance of improvements at Apalachicola Bay and of the Chattahoochee River. The possession of such a dredge will greatly reduce future estimates for gradually deepening this channel.

Money statement.

July 1, 1907, balance unexpended	$62,491.13
June 30, 1908, amount expended during fiscal year for maintenance of improvement	13,798.51
July 1, 1908, balance unexpended	48,692.62
July 1, 1908, outstanding liabilities	45,591.89
July 1, 1908, balance available	3,100.73
July 1, 1908, amount covered by uncompleted contracts	44,516.80
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$40,000.00
For maintenance of improvement	35,000.00
	75,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

June 3, 1896	$10,000.00
March 3, 1899	10,000.00
June 6, 1900 (allotment August 25, 1900)	1,700.00
June 6, 1900 (allotment May 13, 1901)	4.08
June 13, 1902	20,000.00
June 13, 1902 (allotment June 25, 1904)	7,500.00
April 28, 1904 (allotment November 14, 1904)	5,000.00
March 3, 1905	15,000.00
March 2, 1907	60,000.00
Total	129,204.08

CONTRACT IN FORCE.

With J. F. Taylor, of Pensacola, Fla., for dredging approximately 250,000 cubic yards through the bar at the mouth of Carrabelle River, Florida, at 17¼

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cents per cubic yard. Date of approval, September 10, 1907; of beginning work, November 14, 1907; of expiration, July 14, 1908.

COMMERCIAL STATISTICS.

The commerce of this port is so combined with that of Apalachicola that a separation is impossible, and reference is made to report upon the improvement of harbor at Apalachicola Bay, Florida, for detailed statistics.

Q 2.

IMPROVEMENT OF APALACHICOLA BAY, FLORIDA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Under project of March 2, 1907, contract was made with the Home Dredging Company, of Mobile, Ala., which company removed 295,365 cubic yards of material between September 25, 1907, and April 11, 1908, giving a channel 10 feet deep and 100 feet wide across the bar at the mouth of the Apalachicola River.

Contract was entered into with Mr. John H. Gardner, of New Orleans, La., for bulkhead 6,900 feet long on the east of this channel. On June 30, 1908, 6,000 feet of this bulkhead had been completed.

RECOMMENDATIONS.

The completion of above contracts will give this harbor fair facilities for its export lumber trade and coastwise commerce.

The existing commerce of Apalachicola requires that the West Pass entrance be opened and maintained for a draft of 18 feet. The additional funds requested are for dredging at West Pass and for maintenance. Of the estimate for maintenance $20,000 is to be applied as one-fourth the cost of a hydraulic dredge, the remaining portion of its cost to be provided for under the estimates for maintenance of improvements at East Pass and Carabelle bar and harbor, Florida, and the Chattahoochee River.

Money statement.

July 1, 1907, balance unexpended		$84,820.74
June 30, 1908, amount expended during fiscal year for works of improvement		64,459.24
July 1, 1908, balance unexpended		20,361.50
July 1, 1908, outstanding liabilities		10,856.91
July 1, 1908, balance available		9,505.59
July 1, 1908, amount covered by uncompleted contracts		9,504.00
Amount (estimated) required for completion of existing project		25,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$25,000.00	
For maintenance of improvement	55,000.00	
		80,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and section 7 of the river and harbor act of 1899.		

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APPROPRIATIONS.

March 2, 1833	$8,700	
July 4, 1836	10,000	
March 3, 1839	9,900	
		$28,600
June 14, 1880	10,000	
March 3, 1881	10,000	
August 2, 1882	25,000	
July 5, 1884	10,000	
August 5, 1886	12,000	
August 11, 1888	20,000	
September 19, 1890	20,000	
July 13, 1892	20,000	
August 18, 1894	15,000	
June 3, 1896	12,000	
		154,000
March 3, 1899	20,000	
June 13, 1902	40,000	
June 13, 1902 (allotment May 25, 1906)	3,000	
April 28, 1904 (allotment May 31, 1904)	12,500	
April 28, 1904 (allotment September 14, 1904)	5,000	
March 3, 1905	40,000	
March 3, 1905 (allotment November 15, 1905)	7,500	
March 3, 1905 (allotment March 22, 1906)	2,500	
March 2, 1907	85,000	
		215,500
Total		398,100

CONTRACT IN FORCE.

With John H. Gardner, of New Orleans, La., for constructing bulkhead on the east side of channel at mouth of Apalachicola River, Florida. Total estimated length, 6,900 running feet, at $288 per hundred running feet. Date of approval, February 20, 1908; of beginning work, March 24, 1908; of expiration, October 24, 1908.

COMMERCIAL STATISTICS FOR PORT OF APALACHICOLA, FLA., FROM JULY 1, 1907, to JUNE 30, 1908.

Exports to foreign ports	$317,838
Exports to coastwise ports	750,000
Imports from foreign ports	70
Duties on imports	14
Total	1,067,922

	Number.	Tons.
Vessels entered from foreign ports	45	21,751
Vessels entered from coastwise ports (estimated)	120	48,432
Total	165	70,183
Vessels cleared for foreign ports	37	16,914
Vessels cleared for coastwise ports (estimated)	125	55,672
Total	162	72,586
Vessels engaged in traffic of the port:		
Steam	40	3,002
Sail	150	1,500
Total	190	4,502

Amount of fees, dues, and duties paid during the year, $1,222.83.

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Freight carried.

Articles.	Quantity.	Value.
Lumber (export).....feet B. M..	30,587,000	$617,000
Miscellaneous (duty added).....	.....	300,000
Total.....	.....	917,000

This statement, obtained from the records of the custom-house at Apalachicola, Fla., includes vessels loaded from both Apalachicola and Carabelle, Fla., all of which use the entrance at East Pass, Carrabelle Harbor. Of the total commerce, probably 40 per cent should be credited to Carrabelle. In addition, there is a large commerce in fish, oysters, coal, naval stores, and miscellaneous merchandise carried in vessels not required to report at the custom-house, and of which no accurate record is kept.

Q 3.

IMPROVEMENT OF APALACHICOLA RIVER, FLORIDA, INCLUDING THE CUT-OFF AND LOWER CHIPOLA RIVER AND THE UPPER CHIPOLA RIVER FROM MARIANNA TO ITS MOUTH.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

(A) APALACHICOLA RIVER.

No work has been done on the Apalachicola River proper, the removal of obstructions elsewhere being more urgent.

(B) CUT-OFF AND LOWER CHIPOLA RIVER.

This section was cleared of obstructions and its condition permanently improved. The snag boat *Chattahoochee* was hauled out on the ways at Apalachicola, Fla., and her rakes, rudders, and hog chains repaired, at a cost of $974.51.

The snag boat *Chattahoochee* removed the following obstructions:

Snags	1,468
Stumps	905
Logs	463
Trees	2,198
Trees trimmed	97
Bushes cut	5,023

At a field cost of $5,605.17.

Dredge *No. 1* removed the following obstructions:

Stumps	611
Logs	89
Trees	116
Bushes cut	184
Material dredged.....cubic yards..	62,562

At a field cost of $4,370.68.

(C) UPPER CHIPOLA RIVER.

The snag boat *Thronateeska* removed the following obstructions:

Snags	2,324
Stumps	851
Logs	271
Trees	1,061
Trees trimmed	284
Bushes cut	1,360

At a field cost of $2,938.47.

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RECOMMENDATIONS.

The Apalachicola River requires the removal of the annual accumulation of logs, snags, and overhanging trees. The cut-off, Lee Slough, and lower Chipola River require the removal of obstructions and dredging, particularly at the sharp bends and narrow places, and since there are no important landings on the corresponding section of the old river it is advisable to increase the size of the new channel as rapidly as possible.

The upper Chipola River, now made part of this improvement, requires the removal of snags and overhanging trees between Look and Tremble shoal and the foot of the Dead Lakes at the lower Chipola River and the dredging and regulation of a channel through the mud bar at Sister Islands. This work will open up a waterway from the Apalachicola River system to Look and Tremble shoal, about 45 miles below Marianna. To extend the improvement farther would require the construction of at least one lock and dam and very expensive channel work over rock shoals; therefore, no further work than above outlined is recommended, as the river above Look and Tremble shoal is now in satisfactory condition for rafting.

Money statements.

APALACHICOLA RIVER.

July 1, 1907, balance unexpended	$1,000.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	22.50
July 1, 1908, balance unexpended	977.50
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	1,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899	

LOWER CHIPOLA RIVER.

July 1, 1907, balance unexpended		$13,711.24
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$1,500.00	
For maintenance of improvement	6,945.32	
		8,445.32
July 1, 1908, balance unexpended		5,265.92
July 1, 1908, outstanding liabilities		1,625.84
July 1, 1908, balance available		3,640.08
Amount (estimated) required for completion of existing project		5,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$5,000.00	
For maintenance of improvement	9,000.00	
		14,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

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UPPER CHIPOLA RIVER.

July 1, 1907, balance unexpended	$7,501.00
June 30, 1908, amount expended during fiscal year for works of improvement	3,912.00
July 1, 1908, balance unexpended	3,589.00
July 1, 1908, outstanding liabilities	79.34
July 1, 1908, balance available	3,509.66
Amount (estimated) required for completion of existing project	30,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Apalachicola River.

May 23, 1828	$3,000	August 18, 1894	$5,000
April 23, 1830	2,000	June 3, 1896	5,000
March 2, 1831	8,000	March 3, 1899	3,000
June 23, 1874	10,000	June 6, 1900 (allotment July 19, 1900)	1,500
March 3, 1875	10,000	June 13, 1902	6,000
June 18, 1878	8,000	June 13, 1902 (allotment May 31, 1904)	3,750
March 3, 1879	5,000	March 3, 1905	8,000
June 14, 1880	2,000	March 3, 1905 (allotment November 15, 1905)	5,000
March 3, 1881	1,500	March 2, 1907	16,000
August 2, 1882	2,000	Total	115,750
July 5, 1884	1,000		
August 5, 1886	1,000		
September 11, 1888	2,000		
September 19, 1890	2,000		
July 13, 1892	5,000		

Upper Chipola River from Marianna to its mouth.

March 3, 1899	$5,000
June 13, 1902	2,000
March 3, 1905 (allotment March 31, 1905)	4,000
March 2, 1907 (allotment March 27, 1907)	9,000
Total	20,000

COMMERCIAL STATISTICS.

The commerce of this stream is chiefly cotton, naval stores, general merchandise, saw logs, and timber for export. This river runs through a section of country where there are no railroads, and the country bordering upon it depends largely on the steamboats for transportation of products and supplies. There is also a large passenger traffic on the stream.

Reference is made to report on the Flint River improvement for detailed statistics.

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Q 4.

IMPROVEMENT OF FLINT RIVER, GEORGIA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Work has been confined to shoals between Ferguson and Dry Bread, 22 and 40 miles, respectively, below Albany, and consisted in blasting through rock reefs, removing loose bowlders, widening and straightening the channel previously worked over, and deepening minor reefs. Summary of work follows:

Rock excavation:	Cubic yards.
Ferguson shoals	724
Newton shoals	34
Jumping Gully	543
Dry Bread shoals	1,791
Total	3,092

At a field cost of $6,616.88, or $2.14 per cubic yard.

A grapple dredge of one cubic yard capacity was built during the year at a total cost of $11,730.84, and was sent to the Flint River improvement to start work on July 1, 1908.

RECOMMENDATIONS.

It is recommended that for the present work be confined to the river below Newton, Ga., and include the enlargement of channels through rock reefs and the removal of bowlders between Newton and Bainbridge, the removal of isolated bowlders below Bainbridge, and such snagging operations as may be required for maintenance.

It is proposed to apply the available balance and the funds recommended in continuing such work.

Money statement.

July 1, 1907, balance unexpended		$20,419.58
June 30, 1908, amount expended during fiscal year for works of improvement		19,781.40
July 1, 1908, balance unexpended		9,638.18
July 1, 1908, outstanding liabilities		2,179.13
July 1, 1908, balance available		7,459.05
Amount (estimated) required for completion of existing project		62,500.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$22,500.00	
For maintenance of improvement	2,500.00	
		25,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

June 23, 1874	$18,000	September 19, 1890	$20,000
March 3, 1875		July 13, 1892	15,000
August 14, 1876		August 18, 1894	8,000
June 18, 1878	10,000	June 3, 1896	8,000
March 3, 1879	7,000	March 3, 1899	5,000
June 14, 1880	20,000	June 13, 1902	25,000
March 3, 1881	15,000	March 3, 1905	20,000
August 2, 1882	25,000	March 2, 1907	25,000
July 5, 1884	20,000		
August 5, 1886	20,000	Total	281,000
August 11, 1888	20,000		

COMMERCIAL STATISTICS.

The commerce of this stream is principally cotton, naval stores, and lumber. There are great quantities of fine timber along the banks of the river, mainly pine, cypress, and hardwood. When the river is made navigable from Albany to Bainbridge the entire year it will greatly benefit these industries, and new ones will spring up along the stream.

Statement of business done by Throatateeska Navigation Company from January 1, 1907, to December 31, 1907.

Stern-wheel steamboat.	Registered tonnage.	Draft.		Between—	Passengers.
		Light.	Loaded.		
		Inches.	*Inches.*		
Jno. R. Sharpe and barge	50	18	54	Bainbridge and Newton, Ga.	(a)

a Freight only.

Freight carried.

Articles.	Quantity.	Tons.
Cotton, bales	1,000	250
Cotton seed, sacks	12,000	600
Cotton-seed meal, do	3,000	150
Fertilizers, do	16,000	1,600
Oats, do	2,000	160
Corn, do	500	35
Hay, bales	3,000	150
Rosin, barrels	31,200	7,800
Turpentine, do	5,000	1,000
Flour, do	500	50
Sugar, do	150	27
Molasses, do	50	8
Bagging, rolls	300	30
Ties, bundles	800	20
General miscellaneous, packages	1,000	170
Hides and skins, do	200	10
Lumber, feet B. M.	100,000	200
Staves, pieces	60,000	300
Provisions—case goods, packages	3,000	300
Coffee, sacks	50	4
Corn meal, do	1,000	55
Bacon, boxes	156	21
Salt, sacks	100	10
Lard, packages	50	2
Soap, boxes	100	8
Nails, kegs	100	5
Shingles, number	200,000	60
Brick, do	50,000	125
Total		13,145

Estimated value (in round numbers), $1,182,585.

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The steamboat *Raymond H*, formerly plying between Albany and Newton, Ga., is reported to have burned.

Between Bainbridge, Ga., and the mouth of the river the stream is used by the steamers plying the Chattahoochee, Apalachicola, and Chipola rivers, and for the commerce of this entire system for the calendar year 1907 reference is made to the following table, compiled from various reports received:

Stern-wheel steamboat.	Registered tonnage.	Draft.		Round trips.	Between—	Passengers.
		Light.	Loaded.			
		Inches.	*Inches.*			
M. W. Kelly	185	24	48	14	Columbus and Apalachicola.	1,925
Queen City	150	24	48	22	do	1,450
W. C. Bradley	175	24	48	45	do	5,140
Three States	126	20	48	14	do	1,175
John W. Callahan (formerly the "Gertrude").	202	26	54	61	Bainbridge and Apalachicola.	5,566
Ruth No. 2	141	20	48	183	do	8,248
W. H. Hales	60	16	36	14	Chipola River, between Cutoff and steel bridge.	800

Freight carried.

Articles.	Quantity.	Tons.
Cotton ..... bales..	11,031	2,75
Cotton seed ..... sacks..	49,720	2,486
Cotton-seed meal ..... do....	85,595	4,280
Fertilizers ..... do....	37,820	3,780
Oats ..... do....	20,000	1,600
Corn ..... do....	30,000	1,500
Hay ..... bales..	25,000	1,275
Rosin ..... barrels..	54,255	13,564
Turpentine ..... do....	15,955	3,850
Flour ..... do....	6,000	603
Sugar ..... do....	2,000	400
Molasses ..... do....	10,380	2,076
Bagging ..... rolls..	300	30
Ties ..... bundles..	1,000	25
General miscellaneous ..... packages..	303,755	45,563
Hides and skins ..... do....	710	36
Live stock ..... head..	370	185
Lumber ..... feet B. M..	390,000	780
Cross-ties ..... pieces..	50,000	4,500
Provisions—case goods ..... packages..	234,680	23,468
Coffee ..... sacks..	500	40
Corn meal ..... do....	6,000	330
Bacon ..... boxes..	500	89
Salt ..... sacks..	1,000	100
Lard ..... packages..	2,000	100
Soap ..... boxes..	2,500	98
Nails ..... kegs..	1,000	50
Shingles ..... number..	2,965,000	890
Brick ..... do....	575,000	1,438
Total	.....	115,689

Estimated value (in round numbers), $10,000,000.

In addition to the above, large quantities of timber are carried down these streams in rafts to sawmills at Apalachicola and Carrabelle, Fla., for which no value is given, as no record is available, but it is included in the general value of the commerce reported for Apalachicola and Carrabelle, Fla.

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Q 5.

IMPROVEMENT OF CHATTAHOOCHEE RIVER, GEORGIA AND ALABAMA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Jetty system immediately below Columbus, Ga., was repaired and extended from 20 to 24 miles below Columbus. By dredging and with jetties a depth of 4 feet was maintained as far down as the end of the jetty system. Dredging was done at Shell Creek, Uchee Island, Roods Bend, and Gunboat Island. The following is a summary of the work done:

The snag boat *Flint* removed 68 snags, 5 logs, and cut and trimmed 75 trees, at a field cost of $189.89.

Dredge *No. 1* (dipper) excavated 46,547 cubic yards of gravel and marl, at a field cost of $5,796.57, or 12½ cents per cubic yard.

Dredge *No. 2* (12-inch hydraulic) removed 26,515 cubic yards of gravel, at a field cost of $4,748.16, or 18 cents per cubic yard.

Thirteen thousand seven hundred linear feet of jetties were built, at a field cost of $2.30 per linear foot.

Addition and repairs to plant were made as follows:

Quarter boat finished at additional cost of $720.13. Hull of towboat *Columbus* was rotten, and was rebuilt on different model and draft of boat decreased from 36 inches to 24 inches; decks, sides, and rakes of 3 barges were renewed, all at a total cost of $9,043.03 for labor and material, $2,774.15 for expenses to and from the ways at Apalachicola, Fla., and $1,157.50 for hire of the ways.

There was also expended for general repairs to remainder of plant $2,732.85.

RECOMMENDATIONS.

The system of jetties should be farther extended downstream toward Eufaula and maintained; dredging should be done in connection with the works of regulation where required, and the river throughout its length should be kept free from snags and similar obstructions.

It is proposed to apply the available balance and the funds recommended as follows:

Operating snag boat and towboat	$40,000
Operating 2 dredges	30,000
Building works of contraction	90,000
One-half cost of building hydraulic dredge	40,000
Building ways near Columbus, Ga	10,000
Repairing plant	20,000
Total	230,000

Estimate for the remaining cost of above hydraulic dredge is submitted under reports for East Pass and Carrabelle bar and harbor, Florida, and Apalachicola Bay, Florida.

Cost of dredging with the present improvised 12-inch dredge is excessive, being 18 cents per cubic yard. Cost of repairing plant at the ways at Apalachicola, Fla., is also excessive, as above indicated. Ways built near Columbus or Eufaula would have saved nearly

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$4,000 the past fiscal year. The importance of this stream justifies the initial expense of dredge and ways.

Money statement.

July 1, 1907, balance unexpended		$151,654.62
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$45,000.00	
For maintenance of improvement	25,458.12	
		70,458.12
July 1, 1908, balance unexpended		81,196.50
July 1, 1908, outstanding liabilities		5,692.77
July 1, 1908, balance available		75,503.73
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$160,000.00	
For maintenance of improvement	70,000.00	
		230,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

February 24, 1835	$2,000.00
June 23, 1874	[a]52,000.00
March 3, 1875	
August 14, 1876	
June 18, 1878	18,000.00
March 3, 1879	15,000.00
June 4, 1880	20,000.00
March 3, 1881	20,000.00
August 2, 1882	25,000.00
July 5, 1884	35,000.00
August 5, 1886	20,000.00
August 11, 1888	20,000.00
September 19, 1890	20,000.00
July 13, 1892	[b]20,000.00
August 18, 1894	[b]25,000.00
June 3, 1896	[b]20,000.00
March 3, 1899	[b]45,000.00
June 13, 1902	100,000.00
Amount of unexpended balance transferred from appropriation for Chattahoochee River between West Point and Franklin	280.78
April 28, 1904 (allotment May 31, 1904)	32,650.00
March 3, 1905	75,000.00
March 3, 1905 (allottment November 15, 1906)	10,000.00
March 2, 1907	150,000.00
Total	[c]724,930.78

COMMERCIAL STATISTICS.

The commerce interested on this river is chiefly cotton, naval stores, and general merchandise. The river runs through a section of country where there

[a] Allotted from appropriations aggregating $70,000 for improving Chattahoochee and Flint rivers.

[b] Does not include $5,000 for expenditure between West Point and Franklin.

[c] Of this amount, $2,000 (appropriation of February 24, 1835) was carried to the surplus fund.

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are but few railroads (none parallel with the river), and the people depend largely on the boats for their supplies. There is also a large passenger traffic on the river.

The commercial statistics for the Chattahoochee River are so combined with those of the Flint, Apalachicola, and Chipola rivers that a separation is impracticable, and reference is made to report upon Flint River improvement for detailed statistics.

Columbus, Ga., at the head of navigation, with its magnificent water power, is rapidly becoming one of the greatest manufacturing centers of the South, and with the completion of the deep-water harbor projected at the mouth of this system of rivers the importance of this improvement will be greatly increased.

Q 6.

IMPROVEMENT OF CHOCTAWHATCHEE RIVER, FLORIDA AND ALABAMA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

The snag boat *Choctawhatchee* removed the following obstructions:

Snags	579
Trees removed	616
Trees trimmed	78

At a field cost of $3,634.32.

Snag boat was repaired, deck and forward deck timbers being renewed.

RECOMMENDATIONS.

Below Geneva, and especially below the mouth of the Holmes River, the river should be kept clear of all obstructions to provide proper facilities for the timber industry and the important commerce on the two rivers, in which five steamers are engaged.

The channel across the bar at Cypress Top should be maintained to afford proper facilities for the tugs engaged in the large lumber trade of the river.

The additional funds recommended for appropriation are for the river below Geneva, and it is proposed to apply them to removing obstructions below this point and to maintaining the channel below Holmes River.

Money statement.

July 1, 1907, balance unexpended	$9,699.62
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,830.19
July 1, 1908, balance unexpended	5,869.43
July 1, 1908, outstanding liabilities	221.66
July 1, 1908, balance available	5,647.77
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

March 3, 1833	$5,000.00	June 3, 1896	$5,000.00
June 15, 1844	10,000.00	March 3, 1899	16,000.00
June 25, 1874	5,000.00	June 13, 1902	16,000.00
March 3, 1875	5,000.00	June 13, 1902 (allotment May 31, 1904)	3,000.00
August 4, 1876	5,000.00	March 3, 1905	10,000.00
March 3, 1879	5,000.00	March 3, 1905 (allotment July 26, 1905)	2,000.00
June 14, 1880	7,000.00	March 3, 1905 (allotment June 28, 1906)	300.00
March 3, 1881	10,000.00	March 2, 1907	10,000.00
August 2, 1882	[a] 18,000.00	Total	203,300.00
July 5, 1884	15,000.00	Carried to the surplus fund (1852)	2,123.38
August 5, 1886	15,000.00		
August 11, 1888	10,000.00		
September 19, 1890	12,500.00		
July 13, 1892	12,500.00		
August 18, 1894	6,000.00		

COMMERCIAL STATISTICS.

The commerce of this stream is mainly saw logs, timber, naval stores, and general merchandise, the amount of which, during the calendar year 1907, is reported to be 24,000 tons, valued at $2,500,000, nearly all of which is below the mouth of the Holmes River.

Q 7.

IMPROVEMENT OF HOLMES RIVER, FLORIDA, FROM VERNON TO ITS MOUTH.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Snagging operations were carried to Vernon, the head of navigation. The river is in excellent condition.

The snag boat *Choctawhatchee* removed the following obstructions—

Snags	1,482
Overhanging trees removed	565
Overhanging trees trimmed	48

at a field cost of $1,548.15.

Money statement.

July 1, 1907, balance unexpended	$2,000.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	1,321.75
July 1, 1908, balance unexpended	678.25
July 1, 1908, outstanding liabilities	473.94
July 1, 1908, balance available	204.31
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	2,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

[a] Does not include $2,000 allotted for expenditure on Holmes River.

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APPROPRIATIONS.

August 2, 1882	[a] $2,000
August 5, 1886	2,000
August 11, 1888	3,000
September 19, 1890	3,000
April 28, 1904 (allotment Aug. 3, 1904)	2,000
March 3, 1905	2,000
March 2, 1907	2,000
Total	[b] 16,000

COMMERCIAL STATISTICS.

The commerce of this stream, which also forms the larger part of the commerce of the lower Choctawhatchee River, consists of cotton, turpentine, rosin, molasses, honey, and miscellaneous articles, which are carried by water to Pensacola to market. Its value in 1907 is estimated at $1,000,000.

Q 8.

IMPROVEMENT OF BLACKWATER RIVER, FLORIDA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

No work was done.

RECOMMENDATIONS.

The channel should be completed from Milton to Pensacola Bay, as projected, and then maintained, and the appropriation recommended is for this work.

Money statement.

July 1, 1907, balance unexpended		$3,629.02
June 30, 1908, amount expended during fiscal year, for maintenance of improvement		3,358.99
July 1, 1908, balance unexpended		270.03
July 1, 1908, outstanding liabilities		31.82
July 1, 1908, balance available		238.21
Amount (estimated) required for completion of existing project		20,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$20,000.00	
For maintenance of improvement	5,000.00	
		25,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

[a] Allotted from appropriation of $20,000 for improving Choctawhatchee River.
[b] Of this amount, there was returned to the Treasury $4,839.20, which was reappropriated by act of March 3, 1899.

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APPROPRIATIONS.

March 3, 1899	$5,000
March 3, 1905	10,000
March 2, 1907	5,000
Total	20,000

COMMERCIAL STATISTICS.

The value of timber, lumber, and other manufactured wooden products going out of this river amounts to about $1,000,000 annually. In addition, the commerce in general merchandise and other products between Pensacola and Milton amounts to about 3,500 tons, valued at $350,000. There is a dry dock at Bagdad and a marine railway at Milton, to which come nearly all of the steamboats and sailing vessels owned at Pensacola.

Q 9.

IMPROVEMENT OF HARBOR AT PENSACOLA, FLORIDA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Dredging was continued in the Caucus channel by the U. S. dredge *Caucus*.. There was removed 854,305 cubic yards of material, at a field cost of 5.749 cents per yard. This dredging has restored the channel to a width of 275 feet and a depth of 30 feet at mean low water.

On November 22, 1907, the dredge was sent to Mobile, Ala., to install new propeller and to replace the wing furnace of the port boiler; also to make other annual repairs while the vessel was in dock. It was contemplated to reinstall one of the old furnaces which had been re-formed, but this re-forming was imperfectly done and a new furnace had to be ordered. This new furnace was furnished free of expense to the United States, owing to an imperfection in the one previously furnished. All other repairs were completed and the dredge resumed work with one boiler on December 15, 1907. On January 2, 1908, work with both boilers and both pumps was resumed.

The auxiliary inspection schooner for the district was completed at the Pensacola Navy-Yard.

RECOMMENDATIONS.

The dredge *Caucus* should be kept at work continuously until the project has been completed; necessary repairs should be made to keep her in first-class condition, and a full supply of spare parts should be kept on hand to minimize loss of time from breakdowns; facilities for coaling should be installed at the Engineer wharf, Fort Pickens, to reduce loss of time taking fuel, and the necessary surveys and examinations of the improvement be made.

It is proposed to apply the available funds and the additional appropriations recommended to this work.

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Money statement.

July 1, 1907, balance unexpended		$106,276.07
Received for salvage work by dredge *Caucus*		4,752.44
Received from sale of old property		26.77
		111,055.28
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$20,000.00	
For maintenance of improvement	51,879.19	
		71,879.19
July 1, 1908, balance unexpended		39,176.09
July 1, 1908, outstanding liabilities		9,649.60
July 1, 1908, balance available		29,526.49
July 1, 1908, amount covered by uncompleted contracts		3,820.70
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$100,000.00	
For maintenance of improvement	50,000,00	
		150,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

June 18, 1878	$20,000.00	June 6, 1900 (allotment August 18, 1902)	$956.94
March 3, 1879	10,000.00	June 13, 1902	[a] 220,000.00
June 14, 1880	40,000.00	March 3, 1905	100,000.00
March 3, 1881	20,000.00	March 2, 1907	100,000.00
August 2, 1882	50,000.00	Received on account of salvage work by dredge *Caucus*	9,799.32
July 5, 1884	55,000.00	Received on account of salvage work by dredge *Caucus*	4,752.44
August 5, 1886	20,000.00	Received from sale of unserviceable property	26.77
August 11, 1888	35,000.00		
September 19, 1890	25,000.00		
July 13, 1892	75,000.00		
August 18, 1894	100,000.00		
June 3, 1896	200,000.00		
March 3, 1899	70,000.00		
June 6, 1900 (allotment April 15, 1902)	5,000.00	Total	1,160,535.47

CONTRACT IN FORCE.

With Mr. Guy F. Palmes, of Pensacola, Fla. (emergency), for 2,000 tons (estimated) steam coal, on board U. S. dredge *Caucus*, Pensacola, Fla., at $3.24 per ton of 2,240 pounds. Date of contract, March 18, 1908; of commencement, 5 days after notice; of completion, when all coal is delivered.

COMMERCIAL STATISTICS FOR PORT OF PENSACOLA, FLA., FROM JULY 1 1907, TO JUNE 30, 1908.

Exports to foreign ports	$20,322,649.00
Exports to coastwise ports	[b]
Imports from foreign ports	675,503.66
Duties on imports	6,040.72
Total	21,004,193.38

[a] Includes $150,000 appropriated for construction of seagoing dredge and $26,000 allotted by the Chief of Engineers for the same purpose.
[b] No record.

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	Number.	Tons.
Vessels entered from—		
Foreign ports	236	390,435
Coastwise ports	131	284,900
Total	367	675,335
Vessels cleared for—		
Foreign ports	298	507,046
Coastwise ports	68	143,600
Total	366	650,646
Vessels engaged in traffic of the port:		
Steam	28	1,263
Sail	80	2,751
Barges	7	2,143
Total	115	6,157

Amount of fees, dues, and duties paid during the year, $31,438.39.

Freight carried.

Articles.	Quantity.	Value.
Cotton ..... bales..	173,878	$16,661,511
Coal ..... tons..	59,543	207,385
Resin ..... barrels..	413,423	1,720,846
Turpentine ..... gallons..	1,791,157	894,978
Lumber ..... feet B. M..	142,812,000	3,075,940
Tobacco ..... pounds..	10,266,795	944,275
Miscellaneous ..... packages..	.....	3,397,714
Total	.....	20,322,649

Q 10.

IMPROVEMENT OF ESCAMBIA AND CONECUH RIVERS, FLORIDA AND ALABAMA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

General improvement.—Snagging was done over 86 miles of river, obstructions being removed by the snag boat *Escambia*, as follows—

Snags	1,346
Logs	4
Trees	440
Stumps cut	274

at a field cost of $3,221.

Dredging through the bar at the mouth of the river was done by United States 8-inch suction dredge, a total of 14,172 cubic yards of material being removed; in addition, 8 logs were removed from the river, 363 guide piles driven, and 12 pontons built, at a total field cost of $5,897.64.

Conecuh River.—The derrick barge was completed. Barge for storage of dynamite was constructed. Work was done at Bullocks shoals, River Falls, and from there to a point 39 miles below Patsaliga Creek as follows:

Rock blasted and removed from channel	cubic yards	1,658
Marl blasted and removed from channel	do	1,563
Gravel removed from channel	do	65
Logs removed from channel	number	112
Snags removed from channel	do	284
Overhanging trees removed	do	533
Overhanging trees trimmed	do	24

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The field cost of constructing plant and cost of improvement up to the close of the fiscal year ending June 30, 1908, was $8,923.58.

RECOMMENDATIONS.

Funds available for upper section (Conecuh River) are sufficient to complete the project. The lower section of the river is now in good condition for logging and towing of rafts. Funds recommended are for maintenance by necessary snagging and dredging.

Money statements.

GENERAL IMPROVEMENT.

July 1, 1907, balance unexpended	$17,965.98
June 30, 1908, amount expended during fiscal year for maintenance of improvement	10,052.12
July 1, 1908, balance unexpended	7,913.86
July 1, 1908, outstanding liabilities	738.65
July 1, 1908, balance available	7,175.21
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	10,000.00

CONECUH RIVER.

July 1, 1907, balance unexpended	$30,035.80
June 30, 1908, amount expended during fiscal year for works of improvement	8,517.47
July 1, 1908, balance unexpended	21,518.33
July 1, 1908, outstanding liabilities	557.22
July 1, 1908, balance available	20,961.11

APPROPRIATIONS.

For Escambia River:		
March 2, 1833	$5,000	
July 2, 1836	5,500	
June 14, 1880	8,000	
March 3, 1881	5,000	
July 5, 1884	3,000	
		$26,500
For Escambia and Conecuh rivers:		
August 2, 1882	12,000	
July 5, 1884	12,000	
August 5, 1886	12,000	
August 11, 1888	10,000	
September 19, 1890	7,500	
July 13, 1892	8,000	
August 18, 1894	6,000	
June 3, 1896	4,000	
March 3, 1899	5,000	
June 6, 1900 (allotment July 19, 1900)	1,500	
June 13, 1902	5,000	

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For Escambia and Conecuh rivers—Continued.		
March 3, 1905	$10,000	
March 3, 1905 (allotment November 10, 1906)	5,000	
March 2, 1907	15,000	
		$113,00
For Conecuh River:		
March 2, 1907		31,00
Total		170,50
Carried to surplus fund (1838)		5,50
Balance		165,00

COMMERCIAL STATISTICS.

The commerce of this stream is mainly timber and saw logs, the value of which for the calendar year 1907 is reported as $2,500,000.

Q 11.

IMPROVEMENT OF ALABAMA RIVER, ALABAMA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Owing to the long delay in installing the new boilers, the snag boat *Wm. J. Twining* did not commence work until the 4th of November, 1907, and on November 22 work was stopped on account of high water. On June 12, 1908, work was again resumed, the following obstructions being removed from the river:

Overhanging trees	72
Overhanging trees trimmed	10
Snags	153
Stumps on bank cut level	43
Logs removed from bank	99
Deadheads	21

The dipper dredge removed the following quantities of sand and gravel from the channel of the river at the points named:

Silver Creek shoals (upper part)	cubic yards	18,021
Silver Creek shoals (lower part)	do	7,769
Lower end of Dam No. 2, rock and sand	tons	280
Lower end of Dam No. 2, piles		8
Haines Island	cubic yards	8,054
Haines Island, sunken logs		18
Jewett's bar	cubic yards	4,481
Mary Taylor's bar	do	4,810

Jetties were built and repaired as follows:

Location.	Built.	Repaired.
	Linear ft.	*Linear ft.*
Lower Gause's bar	714	.....
Silver Creek shoals	1,306	120
Dam below Haines Island	191	.....
Dam at head of Haines Island	140	.....
Carter shoals	.....	158
Jewett's bar	104	.....
Mrs. Gray's bar	320	.....

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Installation of new boilers on the snag boat *Wm. J. Twining* was completed. Rake of this boat was also repaired.

The cabin of towboat *Alabama* was lengthened to utilize space on forward end of boiler deck.

Four creosoted barges, purchased under contract, were delivered.

Construction of a 15-inch hydraulic dredge was about 60 per cent completed at the close of the fiscal year.

RECOMMENDATIONS.

In addition to the above-named localities of the fiscal year's work, the most troublesome obstructions are at Hobbs Island, Gardners Island, Evans lower bar, McGuires bar, and first bar above Selma.

It is proposed to apply the available balance and the funds recommended as follows:

Operating one suction dredge	$40,000
Operating one dipper dredge	20,000
Operating one snag boat	20,000
Building and repairing works of contruction	100,000
Repair and care of plant	20,000
Total	200,000

Money statement.

July 1, 1907, balance unexpended		$230,340.94
Amount received from sale of boilers		50.00
		230,390.94
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$45,001.72	
For maintenance of improvement	15,000.00	
		60,001.72
July 1, 1908, balance unexpended		170,389.22
July 1, 1908, outstanding liabilities		36,001.12
July 1, 1908, balance available		134,388.10
July 1, 1908, amount covered by uncompleted contracts		26,541.68
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$150,000.00	
For maintenance of improvement	50,000.00	
		200,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 18, 1878	$25,000	June 3, 1896	$40,000
March 3, 1879	30,000	March 3, 1899	50,000
June 14, 1880	25,000	June 13, 1902	20,000
March 3, 1881	20,000	June 13, 1902 (allotment May 31, 1904)	4,000
August 2, 1882	20,000	March 3, 1905	100,000
July 5, 1884	10,000	March 2, 1907	200,000
August 5, 1886	15,000	Received from sale of old property	50
August 11, 1888	20,000		
September 19, 1890	20,000		
July 13, 1892	70,000	Total	719,050
August 18, 1894	50,000		

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CONTRACTS IN FORCE.

With Gulfport Creosoting Company, of Gulfport, Miss., for constructing on creosoted wooden hull, at a cost of $10,960. Date of approval, March 23, 1908 of beginning work, April 27, 1908; of expiration, August 4, 1908.

With the Bucyrus Company, of South Milwaukee, Wis. (emergency), for on 15-inch centrifugal dredging pump and engines, suction discharge pipe, and extr parts, at a total cost of $8,800. Date of contract, March 19, 1908; of beginnin work, March 29, 1908; of expiration, June 10, 1908. (Time limit waived.)

With Hartley Boiler Works, of Montgomery, Ala. (emergency), for one batter of three steel boilers and accessories, at a cost of $4,030. Date of contract March 21, 1908; of beginning work, March 31, 1908; of expiration, Augus 10, 1908.

With Ellicott Machine Company, of Baltimore, Md., for one revolving cutter with shafting and gearing, auxiliary engines, and extra parts, for 15-inch suction dredge, at a cost of $6,500. Date of contract, April 7, 1908; of beginning work, April 17, 1908; of expiration, June 20, 1908. (Time limit waived.)

COMMERCIAL STATISTICS.

The commerce of this stream is important, consisting principally of cotton, cotton seed, fertilizer, grain, lumber, shingles, naval stores, staves, and a large quantity of miscellaneous freight of all descriptions, estimated for the calendar year 1907 as about 17,628 tons, valued at $1,765,000.

Very large quantities of sawn and hewn timber, saw logs, cord wood, etc., consisting of yellow pine, sycamore, cottonwood, poplar, and ash, are barged and rafted down this stream to Mobile. The total amount of this commerce from the Alabama, Tombigbee, and Mobile rivers is reported at, approximately, 810,000 tons, valued at $5,303,914, of which it is estimated that 40 per cent comes from the Alabama River.

This falling off in freight carried from the amounts reported in previous years was largely due to shortage of cotton crop and stringency in the money market.

Q 12.

IMPROVEMENT OF COOSA RIVER, GEORGIA AND ALABAMA.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

(*a*) *Coosa River between Rome and the East Tennessee, Virginia, and Georgia Railroad bridge.*—Work has been confined to improvement and maintenance between Rome, Ga., and Lock No. 4, Alabama. The dredge was operated throughout the season, removing from the channel 59,345 cubic yards of sand, gravel, and blasted rock, at a total cost of $7,002.71, or 11.8 cents per yard. The cost of blasting was $1,303.44. About 1,495 linear feet of jetties was built at a total cost of $8,067.95, or $5.41 per foot.

The locations and details of the year's work are as follows:

Locality.	Jetties built.	Dredging.
	Linear ft	*Cubic yds.*
Fish Trap shoal	552	38,700
Center shoal	460	11,000
Wood's bar	.....	2,000
Croft's shoal	200	7,300
Cattle Island	.....	4,305
Campbell's bar	283	.....
Rum Branch shoal	.....	1,040
Total	1,495	59,345

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In connection with this work 740 trees (over 6 inches in diameter) were cut, at a cost of $51.80.

Repairs to plant consisted in practically rebuilding hull of dredge with lumber treated by open-tank creosoting process, at a cost of $2,636.34, and in minor general repairs, the expense of which was $1,821.74.

RECOMMENDATIONS.

It is proposed to apply the available balance and the funds recommended to improving the channel between Rome Ga., and Lock 4, as provided in the act of March 3, 1905, and to apply the additional appropriation recommended to the construction of additional plant and the further improvement and maintenance of the channel between Rome, Ga., and Lock 4, Alabama.

APPROPRIATIONS.

August 14, 1876	$30,000.00	Received from sales of property	$1,448.05
June 18, 1877	75,000.00	June 13, 1902 (allotment May 31, 1904)	7,500.00
March 3, 1879	45,000.00	March 3, 1905	25,000.00
July 14, 1880	75,000.00	March 2, 1907	[a] 48,000.00
March 5, 1881	60,000.00	Received from Seaboard Air Line Railway for dredging	64.92
August 2, 1882	83,700.00		1,110,712.97
July 5, 1884	50,000.00	Less amount transferred by act of June 13, 1902, to the Oostenaula and Coosawattee rivers	7,155.80
August 5, 1886	45,000.00		
August 11, 1888	60,000.00	Total	1,103,557.17
September 19, 1890	150,000.00		
July 13, 1892	130,000.00		
August 18, 1894	110,000.00		
June 3, 1896	50,000.00		
March 3, 1899	20,000.00		
June 13, 1902	35,000.00		
June 13, 1902, amount made available from lower division of the river	10,000.00		

COMMERCIAL STATISTICS.

[Calendar year 1907.]

Stern-wheel steamboats.	Registered tonnage.	Draft. Light.	Draft. Loaded.	Between—	Passengers.
		Inches.	*Inches.*		
Dixie	74	14	44	Rome, Ga., and Lock 4	20
Alabama	154	18	54	do	

[a] Does not include $2,000 allotted for expenditure at Wetumpka, Ala.

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Freight carried.

Articles.	Quantity.	Tons.
Cotton ..... bales..	8,000	2 000
Cotton seed ..... sacks..	25,000	1,250
Cotton-seed meal ..... do....	15,000	750
Fertilizers ..... do....	18,000	1,800
Oats ..... do....	1,400	112
Corn ..... do....	2,500	125
Hay ..... bales..	1,700	85
Flour ..... barrels..	3,000	294
Sugar ..... do....	800	160
Molasses ..... do....	300	60
Bagging ..... rolls..	1,500	150
Ties ..... bundles..	2,000	50
General miscellaneous ..... packages..	1,500	300
Hides and skins ..... do....	20	1
Live stock ..... head..	20	10
Lumber ..... feet B. M..	600,000	1,200
Provisions (case goods) ..... packages..	100	10
Coffee ..... sacks..	24	2
Corn meal ..... do....	72	4
Bacon ..... boxes..	24	4
Salt ..... sacks..	500	50
Lard ..... packages..	200	10
Soap ..... boxes..	200	7
Nails ..... kegs..	140	7
Shingles ..... number..	60,000	50
Brick ..... do....	200,000	20
Total	.....	8,511

Estimated value (in round numbers), $854,000.

In addition to the above, 11,000,000 feet of logs, valued at $90,000, were reported as moved.

This falling off in freight carried from the amounts reported in previous years was largely due to shortage of cotton crop and stringency in the money market.

(*b*) *Coosa River between Wetumpka and East Tennessee, Virginia and Georgia Railroad bridge.*—The property belonging to the improvement was cared for.

RECOMMENDATIONS.

The buildings at Lock 31 are deteriorating rapidly for want of proper repairs, and the property stored in them needs proper attention and care. There will be required for these repairs $2,000, which should be provided. At present no other work is recommended, pending a decision as to the character and extent of the further improvement of the Coosa River. Should a new project for securing 6-foot navigation in the Coosa and Alabama rivers be adopted, funds should be made available for examination of lock sites, borings for foundations, discharge measurements, gauge observations, and other necessary work preliminary to actual construction.

It is proposed to apply the additional appropriation recommended to the care and preservation of property at Lock 31.

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Money statement.

CONSOLIDATED.

July 1, 1907, balance unexpended		[a]$57,059.09
Received from sale of old property		27.50
Received from Seaboard Air Line for dredging		64.92
		57,151.51
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$21,620.83	
For maintenance of improvement	5,000.00	
		26,620.83
July 1, 1908, balance unexpended		30,530.68
July 1, 1908, outstanding liabilities		3,107.39
July 1, 1908, balance available		27,423.29
Amount (estimated) required for completion of existing project		6,059,913.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$75,000.00	
For maintenance of improvement	25,000.00	
		100,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

September 19, 1890	$150,000.00
July 13, 1892	100,000.00
August 18, 1894	110,000.00
June 3, 1896	50,000.00
Amount received from sale of Government property	423.32
March 2, 1907	[b]2,000.00
Received from sales of property	5.00
Received from sales of property	27.50
	412,455.82
Less amount transferred by act of June 13, 1902, to upper division of the river	10,000.00
Total	402,455.82

COMMERCIAL STATISTICS.

On this part of the Coosa River there is a small commerce in the rafting of logs and square timber, but this can be carried on only during the season when the river is about 12 feet above low water, and no reliable estimate of its value can be obtained.

[a] Erroneously given as $57,054.09 in report for 1907.
[b] Allotted from appropriation of $50,000 for improving Coosa River.

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Q 13.

OPERATION AND CARE OF CANALS AND OTHER WORKS OF NAVIGATION ON COOSA RIVER, GEORGIA AND ALABAMA.

During the fiscal year ending June 30, 1908, the locks were operated without interruption.

An allotment of $8,865 was made during the fiscal year for the following purposes:

Salaries of lock keepers	$1,800
Dredging entrances to Locks 1, 2, and 3	1,500
Repairs to lock keepers' houses at Locks 1, 2, and 3	1,200
Repainting lock house, Dam 4	350
Repairs to Dam 4	2,000
Erection of two creosoted barges at Lock 3	2,015
Total	8,865

All work provided for was done. The two creosoted barges were erected at Lock 3 and launched.

Summary of expenditures made during the fiscal year ending June 30, 1908, at Locks 1, 2, and 3, and Dam 4, and upon construction of barges:

Services	$6,989.34
Material and supplies	1,490.27
Provisions	283.10
Fuel	97.36
Telegrams	.91
Traveling expenses	173.16
Printing	18.00
Creosoted lumber for barges	6,985.00
Total	16,037.14

Q 14.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

For details see current summary, page 392.

CONTRACTS IN FORCE.

With Alex. C. Kittell and Marion C. Lang, for removing wreck of sunken lighter *Georgia* at mouth of Apalachicola River, Florida, at a cost of $640. Date of approval, November 6, 1907; of beginning work, November 9, 1907; of expiration, January 29, 1908. (Time limit waived.) Completed.

With G. H. Langley, for removing wreck of tug *Florence Witherbee*, sunk in Pensacola Harbor, Florida, at a cost of $1,375. Date of approval, November 5, 1907; of beginning work, November 29, 1907; of expiration, January 29, 1908. Completed.

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APPENDIX R.

IMPROVEMENT OF RIVERS AND HARBORS IN THE MOBILE, ALABAMA, DISTRICT.

REPORT OF MAJ. H. JERVEY, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Harbor at Mobile, Alabama.
2. Mobile bar, Alabama.
3. Black Warrior, Warrior, and Tombigbee rivers, Alabama and Mississippi.
4. Operating and care of locks and dams on Warrior and Black Warrior rivers, Alabama.
5. Pascagoula River, Mississippi.
6. Pascagoula, Leaf, and Chickashay rivers, Mississippi.
7. Horn Island Pass, Mississippi.
8. Harbor at Biloxi, Mississippi.
9. Channel from Gulfport to Ship Island Harbor, Mississippi.
10. Wolf and Jordan rivers, Mississippi.
11. Pearl River below Rockport, Mississippi.
12. Pearl River between Edinburg and Jackson, Mississippi.
13. Dredge for harbors on coast of Mississippi.
14. Removing sunken vessels or craft obstructing or endangering navigation.

UNITED STATES ENGINEER OFFICE,

Mobile, Ala., July 14, 1908.

SIR: I have the honor to forward herewith annual report for the fiscal year ending June 30, 1908, for the works of rivers and harbors under my charge.

Very respectfully, your obedient servant,

H. JERVEY,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

R 1.

IMPROVEMENT OF HARBOR AT MOBILE, ALABAMA.

Accounts of the earlier improvement of this locality are contained in the Annual Reports of the Chief of Engineers for 1896, page 1425, 1900, page 2161, and 1903, page 1237.

The river and harbor act of March 2, 1907, authorized the deepening of the channel to as great a depth as the funds will permit.

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During the past fiscal year funds have been applied to the following operations:

1. THE DREDGING AND MAINTENANCE OF A 23-FOOT CHANNEL IN MOBILE HARBOR.

Under a contract with George G. Barker, of Wilmington, Del., dated July 10, 1907, dredging was carried on and is still in progress. Between Beacon 12 and the lower end of the channel the work was done by clam-shell dredges. The contractor kept three dredges on this section. Operations were commenced September 10, 1907, and completed March 21, 1908, resulting in the removal of 2,455,616 cubic yards of material, scow measurement, at a total cost of $217,522.52. The contract price was 8 cents per cubic yard, and the surveys, inspections, and other incidental expenses amounted to 0.86 cent per cubic yard. The least depth in the channel at mean low water was 18.5 feet before dredging and 24.5 feet after dredging. The hydraulic work started at Beacon 12 and has reached a point 510 feet above Beacon 22. The work is actually being done by dredge *No. 6*, of the Bowers Southern Dredging Company. Work was commenced March 31, 1908, and it is expected to be complete by July 15, 1908: 1,009,327 cubic yards, place measurement, have been removed to the end of the fiscal year, at a total cost of $111,469.30.

The contract price was 10 cents per cubic yard, and the surveys, inspections, and other incidental expenses amounted to 1.04 cents per cubic yard. The least depth in this section before dredging was 20 feet, and 23.5 feet after dredging. The admissible draft of ships using the channel has been increased from 21 to 22 feet.

2. DESIGN OF A DREDGE FOR MOBILE HARBOR.

All types of dredges in common use in America and in Europe have been investigated. The *Barnard* was tested in Mobile Bay, but heavy weather damaged the plant and increased the cost of work. Much valuable data was obtained. The *Barnard* removed 29,209 cubic yards, place measurement, on test, at a cost of $3,000. The conclusion reached was that no type of dredge can with certainty be said to be suitable to the whole of Mobile Harbor, but the American hydraulic pipe line dredge promises the greatest measure of success and no risk of loss by its construction is incurred since, should it fail to handle the whole channel it will handle a large share of it, and there is enough work in the Mobile district to keep the dredge constantly occupied. The design of this dredge and its attendant plant has been undertaken, and at the close of the fiscal year the design of the dredge was 90 per cent done; tug, 75 per cent; survey boat, 100 per cent, and pipe line not commenced. A dredge owned and operated by the United States is indispensable for the proper performance of work in this channel.

3. THE REMOVAL OF SUNKEN LOGS AND SIMILAR OBSTRUCTIONS.

The snag boat *Demopolis* has been kept steadily at work during the fiscal year removing sunken obstructions, 1,833 such obstructions having been removed at a total cost of $8,742.71, including about $1,556.85 applied to repair of plant. This work is of great benefit and should be steadily carried on, as new obstructions are constantly coming in.

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4. The dredge *Barnard* pumped ashore for the Quartermaster Department at Fort Morgan, Ala., as filling, about 55,000 cubic yards of sand at a cost of $5,575.80, and though the *Barnard* is not adapted to this class of work a large saving was made over the former cost and time for such work.

5. By act of Congress approved May 28, 1908, the $200,000 allotted from the funds authorized by the river and harbor act of March 2, 1907, to the construction of a dredge, were diverted as follows: $5,000 for the preparation of plans of the dredge and the remainder to work of dredging.

RECOMMENDATION.

Attention is invited to the alignment of the Mobile Harbor dredged channel between Beacon 16 and Beacon 22 below the mouth of Mobile River. This portion of the channel is locally known as the "Elbow," and the several bends in it make navigation difficult for the larger ships carrying the maximum draft available at this port. Even ships drawing 17 or 18 feet must proceed with great care to avoid going on the bank should the vessel fail to answer her helm. These difficulties will increase should the depth of the channel be increased and vessels of correspondingly greater length and beam seek the port.

The "Elbow" may be improved by widening the channel at the bends, and this has been done from time to time under the existing project. A radical improvement, however, demands a straight "cut-off" channel from the mouth of Mobile River to a point at or near Beacon 16. Such a cut-off will be located through very shoal water and will be costly to construct. The future of the port demands this improvement, however, and the present time, before a deeper water project is definitely adopted, seems propitious for the undertaking.

Money statement.

GENERAL IMPROVEMENT.

July 1, 1907, balance unexpended		$190,630.36
Amount appropriated by sundry civil act approved May 27, 1908		160,000.00
		350,630.36
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$88,000.00	
For maintenance of improvement	102,391.82	
		190,391.82
July 1, 1908, balance unexpended		160,238.54
July 1, 1908, outstanding liabilities		138,600.00
July 1, 1908, balance available		21,638.54
July 1, 1908, amount covered by uncompleted contracts		2,000.00
Amount (estimated) required for completion of existing project		272,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$272,000.00	
For maintenance of improvement	200,000.00	
		472,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

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REMOVING OBSTRUCTIONS.

July 1, 1907, balance unexpended	$9,886.30
June 30, 1908, amount expended during fiscal year for maintenance of improvement	8,472.71
July 1, 1908, balance unexpended	1,413.59
July 1, 1908, outstanding liabilities	400.00
July 1, 1908, balance available	1,013.59
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	20,000.00

APPROPRIATIONS.

May 20, 1826	$10,000.00	
March 2, 1829	20,000.00	
June 24, 1834	10,000.00	
March 3, 1835	17,997.60	
March 3, 1837	50,000.00	
July 7, 1838	50,000.00	
August 3, 1852	50,000.00	
		$207,997.60
March 3, 1857 (relief claim)		20,833.00
July 11, 1870	50,000.00	
March 3, 1871	50,000.00	
June 10, 1872	75,000.00	
March 3, 1873	100,000.00	
June 23, 1874	100,000.00	
March 3, 1875	26,000.00	
		401,000.00
June 18, 1878 (survey)	10,000.00	
March 3, 1879	100,000.00	
June 14, 1880	125,000.00	
March 3, 1881	100,000.00	
August 2, 1882	125,000.00	
July 3, 1884	200,000.00	
August 6, 1886	90,000.00	
		750,000.00
August 11, 1888	250,000.00	
September 19, 1890	350,000.00	
July 13, 1892	212,500.00	
March 3, 1893	500,000.00	
August 18, 1894	390,000.00	
March 2, 1895	291,300.00	
March 16, 1896	160,000.00	
June 3, 1896 (maintenance)	60,000.00	
June 4, 1897 (maintenance)	25,000.00	
July 1, 1898 (maintenance)	30,000.00	
		2,268,800.00
March 3, 1899	100,000.00	
June 6, 1900	500,000.00	
June 13, 1902	250,000.00	
March 3, 1903	200,000.00	
March 3, 1905	200,000.00	
March 2, 1907	200,000.00	
May 27, 1908	160,000.00	
		1,610,000.00
April 28, 1904 (maintenance allotment)		50,000.00
June 30, 1907, from sales of Government property		1,100.50
June 30, 1907, from refundment of overpayment		.37
Total		5,309,731.47

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CONTRACT IN FORCE.

With George G. Barker, dated July 10, 1907, for dredging in harbor at Mobile, Ala.; approximately 3,200,000 cubic yards of material, place measurement, to be removed under this contract. Material dredged from the channel north of Beacon 12, Mobile Bay, to be paid for at the rate of 10 cents per cubic yard, place measurement, and that removed from the channel below this beacon to be paid for at the rate of 7½ cents per cubic yard, scow measurement, for material deposited between 2,500 and 3,500 feet from the channel and one-eighth cent additional per cubic yard for each 1,000 feet additional haul up to between 5,500 and 6,500 feet. Approved by the Chief of Engineers August 13, 1907. Work was commenced September 10, 1907, and is to be completed within eighteen months after date of commencement.

COMMERCIAL STATISTICS.

[Statistics furnished by the United States custom-house, Mobile, Ala., showing the business of the port for the calendar year ending December 31, 1907.]

Exports	$27,347,346.00
Imports (valuation at point of shipment)	4,352,933.00
Total	31,700,279.00
Customs receipts from all sources	104,424.18

Vessels entered and cleared, 1907.

Trade.	Entered.		Cleared.	
	Number.	Tons.[a]	Number.	Tons.[a]
Foreign	751	888,777	768	657,164
Coastwise	143	222,682	115	185,206
Total	894	1,111,459	883	842,370

[a] Registered net tons.

FOREIGN COMMERCE.

The following statement concerning the foreign commerce of the port of Mobile for the calendar year ending December 31, 1907, has been compiled from the records of the United States custom-house:

EXPORTS.

Article.	Tons.	Value.
Breadstuffs	106,097	$3,050,285
Coal and coke	18,327	59,496
Cotton and cotton products	58,521	12,523,810
Lumber	440,429	4,276,460
Timber	255,160	2,169,084
Hog products	17,433	2,684,684
Manufactured goods	126,768	1,521,219
Live stock	1,082	144,731
Naval stores	5,098	84,663
Miscellaneous	69,409	832,914
Total	1,098,324	27,347,346

IMPORTS.

Asphalt	1,533	$6,000
Bananas	55,949	1,398,727
Cocoanuts	4,038	133,256
Sisal grass	14,897	2,253,409
Hard wood	4,164	104,359
Sulphur ore	14,227	37,145
Creosote oil	4,787	47,870
Miscellaneous	16,914	372,107
Total	116,509	[a]4,352,933

[a] Valuation at point of shipment.

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Bunker coal furnished outward-bound steamships, 259,875 tons, valued at $869,562.

The following lines of steamships operate between Mobile and foreign ports: United Fruit Company, Central American ports; Orr-Laubenheimer Steamship Company, Central American ports; Camors-McConnell Steamship Company, Central American ports; John B. Cefalu & Co., Central American ports; Hubbard-Zemurray Steamship Company, Central American ports; Atlantic and Mexican Gulf Steamship Company, Mexican ports; Benemelis Line, Mexican ports; Markley-Miller Steamship Company, Mexican ports; Munson Line, Cuban ports; Elder Dempster Company, United Kingdom and Continent.

The following lines of steamships operate between Mobile and coastwise ports: Mallory Line, Brunswick, Ga., and New York; Pensacola, St. Andrews and Gulf Steamship Company, Florida ports; Mobile and Gulf Steamship Company, Florida ports.

Coastwise commerce for the calendar year 1907.

Article.	Tons.	Value.
Arriving:		
Phosphate	600	$10,800
Anthracite coal	1,162	6,972
Fish and oysters	10,115	786,750
Cement	781	7,814
Cord wood	600	1,400
Lumber and timber	339,510	3,046,000
Cross-ties	7,931	21,000
Naval stores	8,311	396,945
Logs	20,584	135,320
Miscellaneous	77,482	2,287,821
Total	467,076	6,700,822
Departing:		
Cotton	15,167	3,300,065
Lumber and timber	711,745	5,756,018
Coal	3,227	13,912
Gravel	29,500	42,000
Naval stores	1,940	6',000
Hay and grain	8,486	209,804
Miscellaneous	8,736	639,272
Total	778,801	10,023,071

In addition to the above, water shipments to and from Alabama and Tombigbee river points, consisting of cotton, cotton seed, logs, provisions, feed, machinery, farm supplies, and manufactured goods, amounted in 1907 to about 584,413 tons, valued at about $11,948,073.

Comparative statement of the number and draft of vessels passing up and down the dredged channel for the calendar years ending December 31, 1906 and 1907.

[Compiled from the books of the harbor master at Mobile, Ala.]

Draft.	Steamships.				Square-rigged vessels.			
	Up.		Down.		Up.		Down.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Less than 13 feet	462	477	310	294	39	52	2	5
13 to 14 feet	140	120	117	118	14	11	2	2
14 to 15 feet	35	34	46	50	3	6	3	1
15 to 16 feet	69	38	44	34	2	1	10	2
16 to 17 feet	12	40	41	59	2	1	9	19
17 to 18 feet	9	7	28	32	1	1	3	6
18 to 19 feet	7	.....	39	30	1	2	3	7
19 to 20 feet	3	7	37	31	2	.....	7	9
20 to 21 feet	3	2	43	40	1	1	17	11
21 to 22 feet	.....	1	29	38	1	1	4	14
22 to 23 feet	.....	.....	6	.....	.....	.....	1	.....
Total	740	726	740	726	66	76	66	76

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Comparative statement of the number and draft of vessels, etc.—Continued.

Draft.	Schooners.				Total.			
	Up.		Down.		Up.		Down.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Less than 13 feet	191	243	65	80	692	772	377	379
13 to 14 feet	3	3	53	80	157	134	172	150
14 to 15 feet	2	1	29	38	40	41	78	89
15 to 16 feet	1	.....	17	47	72	39	71	83
16 to 17 feet	1	.....	11	23	15	41	61	101
17 to 18 feet	4	1	6	8	14	9	37	46
18 to 19 feet	2	.....	7	14	10	2	54	51
19 to 20 feet	.....	.....	10	6	5	7	54	46
20 to 21 feet	.....	.....	4	2	4	8	64	53
21 to 22 feet	.....	.....	1	.....	1	2	34	52
22 to 23 feet	.....	.....	1	.....	.....	.....	8	.....
Total	204	248	204	248	1,010	1,050	1,010	1,050

R 2.

IMPROVEMENT OF MOBILE BAR, ALABAMA.

At the beginning of the fiscal year the channel was obstructed by numerous shoals, and the work accomplished during the year has been applied to the removal of these shoals and increasing the depth and width of the channel within the limits of the project.

The U. S. dredge *Charleston* was engaged on this channel most of the year. She was removed to the Horn Island Pass work when weather conditions prevented her working on Mobile bar, but she has recently returned to the work on this bar. During the year she has removed from the bar channel 185,683 cubic yards of material, bin measurement, at a total cost of $27,837.72, all incidental expenses included. She has deepened most of the channel to 30 feet or over, though there are a few ridges along the center line where the depth is about 27½ feet and some ridges near the edges of the channel where the depth is as low as 24 feet.

The *Charleston* is much in need of repairs, without which it is not believed that she will last more than a year longer, but with which repairs she may continue in service for many years. It is proposed to make these repairs and to divide their cost equally between the appropriations for Mobile bar and Horn Island Pass. The estimates of funds required on these improvements have been increased to cover this, as available funds are not sufficient to make the necessary repairs to the dredge and continue work of dredging, too.

For commercial statistics, see report on Mobile Harbor, Alabama, foreign and coastwise.

Money statement.

July 1, 1907, balance unexpended		$52,919.35
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$10,919.35	
For maintenance of improvement	16,918.37	
		27,837.72
July 1, 1908, balance unexpended		25,081.63
July 1, 1908, outstanding liabilities		7,000.00
July 1, 1908, balance available		18,081.63

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Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908 ..... $50,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 13, 1902	$50,000
March 3, 1905	50,000
March 2, 1907	50,000
Total	150,000

R 3.

IMPROVEMENT OF BLACK WARRIOR, WARRIOR, AND TOMBIGBEE RIVERS, ALABAMA AND MISSISSIPPI.

PROJECT FOR BLACK WARRIOR, WARRIOR, AND TOMBIGBEE RIVERS, ALABAMA.

(A) BLACK WARRIOR RIVER (ABOVE TUSCALOOSA, ALA.).

PRESENT CONDITION OF WORK.

Four locks (10, 11, 12, and 13) completed and opened for traffic; two locks (14 and 15) begun under continuing contract and 5 per cent completed; four locks not yet begun. Survey for these four locks (16, 17, 18, and 19) has been completed, plans and specifications prepared for one of them (16), and negotiations for purchase of sites are now in progress.

WORK OF THE PAST YEAR.

Location surveys and foundation borings have been made for Locks 16, 17, 18, and 19; plans and specifications for Lock 16 prepared and forwarded for approval; plans and specifications for Lock 17 nearly completed. Negotiations for purchase of sites for Locks 16 and 17 are now in progress. Sites for Locks 14 and 15 have been purchased. Telephone line built connecting these locks with Government line at Lock 13; 6-inch well drilled at Lock 14 and drilling one at Lock 15 now in progress; all material for gates and special irons at Locks 14 and 15 purchased and delivered, construction of same begun; valves purchased, but not yet delivered. Contract has been let for the construction of Locks 14 and 15; the contractors have about completed their camps and have installed a large amount of plant; railroad siding built at Lock 14 for unloading material; gasoline towboat and two light-draft barges built for delivering material about 4,000 feet below Lock 15, from which point a railroad has been built to lock site; quarrying has been commenced at Lock 14.

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Up to June 30 the contractors had accomplished the following contract work:

Material.	Quantity.	Lock 14.	Lock 15.
Grubbing and clearing	Acres	8	
Common excavation	Cubic yards	4,879	269
Rock excavation	do		64
Cofferdam timber	Feet B. M.	140,769	
Cofferdam timber delivered	do	50,881	9,264
Cement delivered	Barrels	1,999	
Lock tender's house		Complete	

NAVIGATION AND COMMERCE.

The bulk of the traffic on this part of the river passes through Locks 10, 11, 12, and 13, and is given in detail in the report on operating and care of locks and dams, Black Warrior River, Alabama. In addition to this there is a small traffic in coal on the pool between Locks 12 and 13, statistics of which are not available.

(B) WARRIOR RIVER (BELOW TUSCALOOSA, ALA.).

PRESENT CONDITION OF WORK.

Three locks (7, 8, and 9) are completed and in operation, and the other three locks, begun under continuing contract, are now under construction with hired labor. The last three locks and abutments are completed and the dams about 90 per cent completed. The gates for two of these locks have been installed and the locks operated regularly for traffic for several months. The gates at the third lock are about 85 per cent completed and work on them is now in progress.

WORK OF THE PAST YEAR.

During the past fiscal year the work of construction at Locks 1, 2, and 3 has been carried on whenever stage of river would permit, and the high-water season utilized for the delivery of the balance of material needed to complete the locks. The work of construction has been seriously delayed by an unusual amount of high water.

During the year the following work was accomplished by hired labor:

Material.	Quantity.	Lock 1.	Lock 2.	Lock 3.
Excavated material	Cubic yards	30,847	46,172	37,546
Concrete	do		797	960
Gravel filling	do	775	1,651	353
Stone filling	do	8,742	8,576	3,096
Riprap, hand placed	do	401	1,184	1,827
Miter sills	Feet B. M.	140		
Cofferdam timber	do	31,508	4,632	37,345
Dam timber	do	337,102	293,903	139,171
Framed timber	do	274,314	232,651	89,732
Sheathing	do		2,390	
Sheet piling	do			82,521
Foundation piles delivered	Linear feet			10,278
Foundation piles driven	do			7,531
Cluster piles driven	do			1,280
Drain pipe	do			99
Erecting gates	Pounds	179,374	179,374	
Valves and special irons placed	do	7,217	37,813	8,369

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MAINTENANCE.

There have been no funds available for maintenance work. Considerable dredging is needed at the upper end of each lock pool and numerous snags and overhanging trees should be removed.

NAVIGATION AND COMMERCE.

A portion of the traffic on this stream passed Locks 7, 8, and 9, and is given in detail in the report of operating and care of locks on Black Warrior River. In addition to this about 17,000 tons of logs were shipped from points below Lock 7.

(c) TOMBIGBEE RIVER.

WORK OF THE PAST YEAR.

At Lock 1 additional land was purchased. The work of construction was continued by hired labor throughout the year whenever the stage of river would permit. The short period of low water seriously affected the progress of the work. No work of importance could be done before July 10 or after November 22, 1907. The erection of all lock gates, valves, and special irons was completed August 20, 1907.

The excavation for abutment was completed, the abutment and 260 linear feet of the concrete dam were built, and in addition 40 linear feet of dam was about 50 per cent completed. Cofferdams were necessary for this work. Excavation of upper lock approach is practically completed, of lower approach in progress. Filling behind bank wall was completed June 17, 1908. Placing of riprap is in progress.

First boat, steamer *W. J. Bethea*, was locked through on November 24, 1907, since which time lock was used when rendered necessary by the velocity of current through gap left for navigation.

Summary of work accomplished during the year:

Excavation, earth	cubic yards	23,088
Excavation, rock	do	722
Concrete placed	do	3,663
Gravel filling	do	160
Stone filling placed	do	1,111
Riprap placed	do	764
Timber, framed, for cofferdam	feet B. M.	74,478
Timber, sheathing, for cofferdam	do	75,172
Timber, framed, heart	do	10,024
Drainpipe laid	linear feet	105
Lumber received and stored	feet B. M.	335,330
Stone received and stored	cubic yards	2,226
Cement received and stored	barrels	2,000

By newspaper advertisement dated January 15, 1907, proposals were invited for building Lock and Dam No. 2, but no formal bids being received, proposals were invited by newspaper advertisement for sixty days for building Locks and Dams Nos. 2 and 3 simultaneously, the bids being opened October 5, 1907.

The contract was awarded to the lowest bidder, P. H. O'Brien, of Anniston, Ala., date of contract being December 4, 1907, approved by the Chief of Engineers January 8, 1908.

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Contractor arrived on the site of each lock on January 19, 1908, with mules and wheel scrapers for beginning the excavation. Up to June 30, 1908, operations under contract have been confined chiefly to grubbing, clearing, and excavation.

The construction of gates and special irons are in progress at the Tuscaloosa shops.

The land needed for the site at Lock 3 was purchased and paid for.

TELEPHONE.

Under emergency contract dated March 29, 1907, 64 miles of telephone line from Jackson, Ala., to Locks 1 and 2, which was about 50 per cent completed at the beginning of the fiscal year, was completed.

An extension of this line, about 21 miles, between Locks 2 and 3 has been built.

LOCK HOUSES.

One lock tender's house was built at the site of Lock No. 3 by P. H. O'Brien under contract dated December 4, 1907.

PRESENT CONDITION OF THE WORK.

Lock No. 1 is about 85 per cent completed. Lock No. 2 is about 5 per cent completed. Lock No. 3 is about 2 per cent completed.

Money statements.

LOCKS AND DAMS.

July 1, 1907, balance unexpended	$778,176.31
Amount appropriated by sundry civil act approved May 27, 1908	530,000.00
June 30, 1908, sales of Government property	13.60
June 30, 1908, refundment of overpayment	15.01
	1,308,204.92
June 30, 1908, amount expended during fiscal year for works of improvement	[a] 501,173.45
July 1, 1908, balance unexpended	807,031.47
July 1, 1908, outstanding liabilities	43,500.00
July 1, 1908, balance available	763,531.47
July 1, 1908, amount covered by uncompleted contracts	1,412,600.00
Amount (estimated) required for completion of existing project	2,912,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	1,000,000.00

DREDGE.

July 1, 1907, balance unexpended	$3,445.70
June 30, 1908, refundment of an overpayment	30.00
	3,475.70
June 30, 1908, amount expended during fiscal year for works of improvement	3,475.70

[a] Does not include $6 expended for Isthmian Canal Commission, to be returned.

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LOCK HOUSES.

July 1, 1907, balance unexpended		$22,267.4
June 30, 1908, amount expended during fiscal year, for works of improvement		2,582.6
July 1, 1908, balance unexpended		19,684.8

APPROPRIATIONS.

BLACK WARRIOR RIVER.

July 5, 1884	$50,000.00	
August 1, 1886	56,250.00	
August 11, 1888	100,000.00	
September 19, 1890	150,000.00	
July 13, 1892	200,000.00	
August 18, 1894	37,500.00	
June 3, 1896	10,000.00	
March 3, 1899	50,000.00	
June 6, 1900	86,824.00	
March 3, 1901	53,676.00	
Amount transferred from Warrior River appropriation by act of June 13, 1902	14,000.00	
	808,250.00	
June 30, 1906, from sales of Government property	201.92	
		$808,451.92

WARRIOR AND TOMBIGBEE RIVERS.

March 3, 1875	$25,000.00	
August 14, 1876	15,000.00	
June 18, 1878	28,000.00	
March 3, 1879	20,000.00	
		88,000.00

WARRIOR RIVER.

Previous projects:		
June 14, 1880	$20,000.00	
March 3, 1881	10,622.00	
August 2, 1882	10,000.00	
July 5, 1884	12,000.00	
August 5, 1886	18,750.00	
August 11, 1888	18,000.00	
September 19, 1890	45,000.00	
July 13, 1892	75,000.00	
August 18, 1894	40,000.00	
June 3, 1896	70,000.00	
		319,372.00
Existing project:		
March 3, 1899	220,000.00	
June 6, 1900	200,000.00	
June 6, 1900 (emergency act—allotted)	3,691.24	
March 3, 1901	240,000.00	
June 13, 1902	374,000.00	
March 3, 1903	200,000.00	
April 28, 1904	225,000.00	
March 3, 1905	15,000.00	
March 3, 1905 (allotment)	7,500.00	
June 30, 1906	60,000.00	
June 30, 1906 (allotment)	86,966.00	
	1,632,157.24	

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Existing project—Continued.			
Less amount transferred to Black Warrior River by act of June 13, 1902	$14,000.00		
Amount diverted for survey for location of lock sites in Tombigbee River, as authorized by act of June 13, 1902	13,000.00		
		$27,000.00	
		1,605,157.24	
June 30, 1906, from sales of Government property		467.11	
Amount refunded from allotment for operating and care of locks, Black Warrior River		3,000.00	
			$1,608,624.35

TOMBIGBEE RIVER.

June 13, 1892		$50,000.00	
August 18, 1894		50,000.00	
June 3, 1896		50,000.00	
March 3, 1899		50,000.00	
March 3, 1905 (including amounts for dredge and lock houses)		92,500.00	
June 30, 1906 (including amount for lock houses)		456,500.00	
March 4, 1907 (including amount for lock houses)		238,000.00	
Amount diverted from Warrior River appropriation for survey for location of lock sites, as directed by act of June 13, 1902		13,000.00	
		1,000,000.00	
June 30, 1906, from sales of Government property		175.00	
			1,000,175.00

BLACK WARRIOR, WARRIOR, AND TOMBIGBEE RIVERS.

March 2, 1907		$350,000.00	
June 30, 1908, from sales of Government property		38.60	
June 30, 1908, refundment of overpayments		45.26	
May 27, 1908		530,000.00	
			880,083.86
Total			4,704,707.13

CONTRACTS IN FORCE.

With P. H. O'Brien, dated December 4, 1907, for building Locks and Dams Nos. 2 and 3, Tombigbee River, Alabama, and lock-tender's house at the latter lock, at the following unit prices:

19 acres grubbing and clearing, at $200 per acre.
209,400 cubic yards common excavation, at 40 cents per cubic yard.
8,400 cubic yards foundation excavation, at $1.40 per cubic yard.
16,000 cubic yards foundation excavation, at $1.25 per cubic yard.
12,600 cubic yards stone filling, at $5 per cubic yard.
19,200 cubic yards stone filling, at $4.50 per cubic yard.
35,900 cubic yards concrete, at $8.45 per cubic yard.
2,000 cubic yards gravel filling, at $2 per cubic yard.
5,400 cubic yards riprap, hand placed, at $5.50 per cubic yard.
2,900 cubic yards riprap, hand placed, at $5 per cubic yard.
7,200 feet B. M. miter sills, at $100 per 1,000 feet B. M.
859,000 feet B. M. framed timber, square edged, sound, at $45 per 1,000 feet B. M.
950,000 feet B. M. framed timber, heart, at $47.50 per 1,000 feet B. M.
629,500 feet B. M. cofferdam timber, at $37.50 per 1,000 feet B. M.
80,000 feet B. M. sheathing, at $35 per 1,000 feet B. M.

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800 linear feet drain pipe, at $1.50 per linear foot.
188,000 pounds placing valves and special irons, at 4 cents per pound.
Lock-tender's house, complete, $2,500.
Approved by the Chief of Engineers January 8, 1908.
Work commenced January 19, 1908; to be completed within 500 good working days after notification of approval of contract by the Chief of Engineers.

With the Dravo Contracting Company, dated December 23, 1907, for building Locks and Dams Nos. 14 and 15, Black Warrior River, Alabama, and a lock-tender's house at each of these locks, at the following unit prices:

6 acres grubbing and clearing, at $100 per acre.
102,300 cubic yards common excavation, at 70 cents per cubic yard.
3,300 cubic yards rock excavation, at $3.50 per cubic yard.
2,600 cubic yards rock excavation, at $3.75 per cubic yard.
7,580 cubic yards stone filling, at $2.50 per cubic yard.
29,850 cubic yards concrete, at $7.50 per cubic yard.
32,180 cubic yards concrete, at $8.25 per cubic yard.
3,940 cubic yards riprap, hand placed, at $3 per cubic yard.
7,200 feet B. M. miter sills, at $100 per 1,000 feet B. M.
194,700 feet B. M. framed timber, square edged, sound, at $65 per 1,000 feet B. M.
180,800 feet B. M. framed timber, heart, at $70 per 1,000 feet B. M.
471,000 feet B. M. cofferdam timber, at $55 per 1,000 feet B. M.
352,000 feet B. M. cofferdam timber, at $60 per 1,000 feet B. M.
40,000 feet B. M. sheathing, at $50 per 1,000 feet B. M.
170,000 pounds placing valves and special irons, at 1 cent per pound.
Two lock-tenders' houses, complete, at $3,000 each.
Approved by the Chief of Engineers February 1, 1908.
Work commenced February 21, 1908; to be completed within 500 good working days after notification of approval of contract by the Chief of Engineers.

(D) TOMBIGBEE RIVER, MOUTH TO DEMOPOLIS.

The only work done during the past fiscal year was occasional snagging by the snag boat *Black Warrior*, the repair of this snag boat, the care and preservation of public property, and the payment of office expenses.

Under date of February 26, 1908, a contract was let to Ed. J. Howard, of Jeffersonville, Ind., for the construction of two stern-wheel snag boats, one of which is to be used on this river and on Pascagoula, Leaf, and Chickasahay rivers, and will be paid for from appropriations for these works. These snag boats are now under construction and it is expected that they will be completed and delivered at Mobile early in the coming fiscal year.

The snag boat *Black Warrior* is just about worn out in hull and boilers and should be rebuilt or replaced with another boat. The presence of one snag boat in the Tombigbee River is constantly necessary.

It is proposed to resume snagging work as soon as the new snag boat is delivered.

Money statement.

July 1, 1907, balance unexpended	$26,568.30
June 30, 1908, amount expended during fiscal year for maintenance of improvement	4,635.17
July 1, 1908, balance unexpended	21,933.13
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	26,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

Previous projects:		
June 10, 1872	$5,332.95	
June 14, 1880 (below Vienna)	15,000.00	
March 3, 1881 (below Vienna)	7,988.00	
August 2, 1882 (below Vienna)	12,500.00	
July 5, 1884 (below Vienna)	15,000.00	
August 5, 1886 (below Vienna)	11,250.00	
August 11, 1888 (below Vienna)	6,000.00	
September 19, 1890	55,000.00	
July 13, 1892	[a] 75,000.00	
August 18, 1894	[a] 25,000.00	
June 3, 1898	[a] 25,000.00	
Allotted from emergency act June 6, 1900	3,980.81	
		$257,051.76
June 13, 1902 (allotment)	16,000.00	
Allotted from act June 13, 1902	3,776.31	
March 3, 1905	15,000.00	
March 2, 1907	16,000.00	
		50,776.31
June 30, 1907, from sales of Government property		72.69
Total		307,900.76

CONTRACT IN FORCE.

With Ed. J. Howard, dated February 26, 1908, for building and delivering at Mobile, Ala., two self-propelling stern-wheel snag boats for $38,000. Approved by the Chief of Engineers March 18, 1908. Work commenced April 20, 1908, and was to have been completed June 1, 1908, but this time limit has been extended for a reasonable period.

It is proposed to pay for these snag boats as follows:

From appropriation for—		
Improving Tombigbee River, Alabama, mouth to Demopolis		$12,000
Improving Pascagoula, Leaf, and Chickasahay rivers, Mississippi:		
Pascagoula River	$6,000	
Leaf River	1,000	
		7,000
Improving Black Warrior, Warrior, and Tombigbee rivers, Alabama, for locks and dams		10,000
From allotment for operating and care of canals and other works of navigation: Indefinite, Black Warrior and Tombigbee rivers, Alabama		9,000
		38,000

COMMERCIAL STATISTICS.

Commerce of the Tombigbee River, mouth to Demopolis, during the calendar year ending December 31, 1907, consisted of cotton, cotton seed, logs, timber, sand, gravel, breadstuffs, fertilizer, farm supplies, provisions, machinery, and general merchandise. The amount of this commerce was about 429,931 tons, valued at $8,600,479.

(E) TOMBIGBEE RIVER, DEMOPOLIS TO COLUMBUS.

Between 16 and 60 miles below Columbus, Miss., about 44 miles of river were worked over with the snag boat *Vienna*, when the plant

[a] Portions of Tombigbee River appropriations applied to snagging work.

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was laid up on account of high water. Work will be resumed when the stage of the river will permit. The following is a statement of work accomplished:

Overhanging trees removed	724
Bushes cut	425
Logs and stumps removed from banks and drift piles	781
Logs, snags, and stumps removed from river	1,479
Total obstructions removed	3,409
Number of piles driven	995
Square feet of mattress laid	1,905

The work is of great benefit, but no definite figures as to the monetary value are obtainable.

Money statement.

July 1, 1907, balance unexpended	$14,063.43
June 30, 1908, amount expended during fiscal year for maintenance of improvement	4,375.49
July 1, 1908, balance unexpended	9,687.94
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	22,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 14, 1880 (Columbus to Vienna)	$12,000
March 3, 1881 (Columbus to Vienna)	6,390
August 2, 1882 (Vienna to Fulton)	7,500
July 5, 1884 (Vienna to Fulton)	10,000
August 5, 1886 (Vienna to Fulton)	7,500
August 11, 1888 (Vienna to Fulton)	6,500
September 19, 1890	15,000
July 13, 1892	35,000
August 18, 1894	50,000
June 3, 1896	50,000
March 3, 1899	10,000
March 3, 1905 (allotment)	10,000
March 2, 1907 (allotment)	12,000
Total	231,890

COMMERCIAL STATISTICS.

Articles.	Quantity.	Value.
	Tons	
Cotton	637	$138,541
Cotton seed	1,714	32,252
General merchandise	4,304	140,744
Total	6,655	311,537

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(F) TOMBIGBEE RIVER, COLUMBUS TO WALKERS BRIDGE.

Commencing at Walkers Bridge a distance of 60 miles downstream was worked over during the past low-water season, accomplishing the following:

Overhanging trees removed	3,516
Overhanging trees trimmed	411
Bushes cut	12,800
Logs and stumps removed from banks and drift piles	2,419
Logs, stumps, and snags removed from river	9,189
Total obstructions removed	28,335

This work is of great value to rafting, which is the principal commerce on this secton.

Money statement.

July 1, 1907, balance unexpended	$2,291.95
June 30, 1908, amount expended during fiscal year for maintenance of improvement	2,220.81
July 1, 1908, balance unexpended	71.14
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

For Tombigbee River above Columbus:		
June 10, 1872	$4,667.05	
June 18, 1878	12,000.00	
March 3, 1879	10,000.00	
March 14, 1880	4,000.00	
March 3, 1881	1,000.00	
		$31,667.05
For Tombigbee River, Fulton to Columbus:		
July 13, 1892	6,000.00	
August 18, 1894	4,000.00	
June 3, 1896	8,000.00	
March 3, 1899	5,000.00	
		23,000.00
For Tombigbee River, Walkers Bridge to Fulton:		
August 11, 1888	4,000.00	
September 19, 1890	4,000.00	
July 13, 1892 (maintenance)	3,000.00	
August 18, 1894 (maintenance)	1,000.00	
June 3, 1896 (maintenance)	1,000.00	
March 3, 1899 (maintenance)	1,000.00	
		14,000.00
For Tombigbee River, Columbus to Walkers Bridge:		
June 13, 1902 (allotment)	4,000.00	
March 3, 1905 (allotment)	2,000.00	
March 2, 1907 (allotment)	2,000.00	
		8,000.00
Total		76,667.05

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COMMERCIAL STATISTICS.

The commerce on this section of Tombigbee River during the calendar year ending December 31, 1907, consisted of 35,523 tons of logs, valued at $160,000.

R 4.

OPERATING AND CARE OF LOCKS AND DAMS ON WARRIOR AND BLACK WARRIOR RIVERS, ALABAMA.

GENERAL CONDITION OF LOCKS.

LOCKS 7, 8, 9, 10, 11, 12, AND 13.

Locks 7, 8, and 9 are in good condition, though additional riprap for bank protection and additional stone filling below dams are needed to check erosion. There is a heavy deposit of silt in the lock chambers and the approaches to these locks, which will have to be dredged out. Replacing pile clusters above these locks with timber guide cribs filled with stone, which was begun in the previous year, was completed.

Locks 10, 11, and 12 are in good condition, though some dredging is needed in the approaches to Lock 12. Lock 13 is in excellent condition. Dredge is now at work in the lower approach to this lock and should complete all work there in about ten days.

WORK OF PAST YEAR.

Lock 7.—Several snags and some flood deposit have been removed from lock approaches. Bank below lock has been protected by the use of 408 tons or riprap and quarry waste. Eight hundred and thirty-one tons of stone have been filled below lock to check erosion. Telephone line has been repaired by replacing about 125 poles with new ones.

Lock 8.—Three guide cribs built to replace pile clusters along upper approach to lock, 24,179 feet B. M. timber and 1,533 tons stone being used in their construction. Two hundred cubic yards of flood deposit dredged from lock chamber. Seven hundred and seven tons of stone and quarry waste placed on caving banks at and near this lock.

Lock 9.—Four guide cribs built to replace pile clusters along upper approach to lock, 41,494 feet B. M. timber and 2,203 tons stone being used in their construction. Flood deposit was dredged from lock chamber and approaches, and upper approach to lock was straightened and widened by dredging, 2,815 cubic yards in all having been dredged at this lock. Lock tender's house painted.

Lock 10.—General repairs to plant kept up at Tuscaloosa shops, which are located at this lock. Four barges hauled out on ways and thoroughly repaired. Six-inch well drilled, furnishing an abundant supply of excellent water.

Lock 11.—Six-inch well drilled at this lock, furnishing an abundant supply of excellent water.

Lock 12.—One thousand one hundred and seventy cubic yards of flood deposit dredged from lock chamber and approaches.

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Lock 13.—Flood deposit dredged from lock chamber and lower approach to lock widened and straightened by dredging, 2,200 cubic yards of flood deposit, clay, and loose rock having been dredged.

Seven miles of telephone line have been built connecting Locks 12 and 13. One new work barge 24 feet by 90 feet by 5 feet has been built and all material for another one delivered. Steamer *Nugent* and dredge boat repaired and painted. A force with derrick boat and dredge removed all of the worst snags from 40 miles of channel between Locks 9 and 10 and dredged 2,152 cubic yards from Trussells bar, restoring the channel at that point.

Statement of expenditures for operating and caring for Locks 7, 8, 9, 10, 11, 12, and 13, Warrior and Black Warrior rivers, Alabama, during the fiscal year ending June 30, 1908, submitted in accordance with Circular No. 12, Office of Chief of Engineers, dated July 31, 1897.

Items.	Allotted.	Expended.	Balance.	Minus balance.
Salaries of regular employees	$12,000.00	$10,947.76	$1,052.24	.....
Extra labor	1,500.00	435.55	1,064.45	.....
Riprap bank protection, 3,000 tons, at $2.50 per ton	7,500.00	3,183.28	4,316.72	.....
Stone filling below dams, 3,000 tons, at $2.50 per ton	7,500.00	8,078.39	.....	$578.39
Replacing concrete paving at Lock 7	300.00	.....	300.00	.....
Completing guide cribs at Locks 8 and 9	8,000.00	9,621.82	.....	1,621.82
Removing flood deposit from locks and channel	5,000.00	2,623.24	2,376.76	.....
Removing snags and obstructions from channel between locks	3,500.00	3,365.12	134.88	.....
Building snag boat for use in channel between locks	9,000.00	.....	9,000.00	.....
Building two work barges, 24 by 90 feet	5,000.00	3,794.32	1,205.68	.....
Repairs to derrick boat and four barges	1,500.00	3,074.40	.....	1,574.40
Purchase of site for permanent boat yard and ways	2,000.00	282.66	1,717.34	.....
Painting and repairs to gates, valves, and ironwork	1,000.00	63.45	936.55	.....
Painting and repairs to lock houses and fences	700.00	453.79	246.21	.....
Filling above dams	500.00	2.50	497.50	.....
Wells at Locks 10 and 11	800.00	867.23	.....	67.23
Tools and plant	2,000.00	2,611.50	.....	611.50
Fuel, lights, and oil	1,000.00	407.74	592.26	.....
Telephone service and maintenance	1,000.00	665.54	334.46	.....
Incidentals	4,000.00	983.41	3,016.59	.....
Pipe line for dredge	3,500.00	1,674.62	1,825.38	.....
Rebuilding hull of towboat Sylph and refitting same	.....	208.24	.....	208.24
Outstanding liabilities	2,630.02	2,630.02	.....	.....
Total	79,930.02	55,974.58	28,617.02	4,661.58

COMMERCIAL STATISTICS.

Traffic.

Vessels, etc.	Lock No. 7.			Lock No. 8.			Lock No. 9.			Lock No. 10.		
	Ascending.	Descending.	Total.	Ascending.	Descending.	Total.	Ascending.	Descending.	Total.	Ascending.	Descending.	Total.
Passenger boats	3	3	6	3	3	6	.....	.....	.....	.....	.....	.....
Towboats	5	5	10	47	47	94	15	15	30	17	18	35
Government boats	35	34	69	35	35	70	43	43	86	60	60	120
Coal barges	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other barges	2	2	4	54	51	105	16	14	30	18	18	36
Government barges	83	85	168	87	88	175	98	97	195	101	98	199
Government small craft	3	1	4	5	3	8	10	8	18	15	17	32
Small craft	1	2	3	1	2	3	1	3	4	45	48	93
Rafts	.....	13	13	.....	26	26	.....	28	28	.....	11	11
Total	132	145	277	232	255	487	183	208	391	256	270	526
Lockages	22	37	59	81	102	183	60	73	133	120	132	252

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Traffic—Continued.

Vessels, etc.	Lock No. 11.			Lock No. 12.			Lock No. 13.		
	Ascending.	Descending.	Total.	Ascending.	Descending.	Total.	Ascending.	Descending.	Total.
Passenger boats									
Tow boats	18	18	36	18	18	36	11	11	22
Government boats	83	83	166	92	92	184	3	3	6
Coal barges									
Other barges	21	16	37	21	16	37	12	11	23
Government barges	100	100	200	100	100	200	2		2
Government small craft	28	34	62	26	34	60	4	11	15
Small craft	54	49	103	48	40	88	116	107	223
Rafts		10	10		10	10		13	13
Total	304	310	614	305	310	615	148	156	304
Lockages	167	178	345	172	180	352	139	149	288

Commerce.

[In tons.]

Lock and date.	Coal.	Corn.	Flour.	Molasses.	Cotton.	Cotton seed.	Stone.	Logs.	Lumber.	Fertilizer.	General and miscellaneous.	Total.
Lock No. 7.												
July, 1907								120	246			366
August, 1907									60			60
September, 1907									261		3	264
October, 1907							222					222
November, 1907							867		194			1,061
December, 1907							1,694					1,694
January, 1908	139	17	10		173	45	1,592				130	2,106
February, 1908	182						1,858		24		20	2,084
March, 1908	571	30		1	29	53	1,979			111	35	2,809
April, 1908	442						2,571	312				3,325
May, 1908	162						594	178			5	939
June, 1908							408				5	413
Total	1,496	47	10	1	202	98	11,785	610	785	111	198	15,343
Lock No. 8.												
July, 1907							188	1,616	246			2,050
August, 1907							116	1,432	60			1,608
September, 1907								604	261			865
October, 1907							222	720				942
November, 1907							867	552	194			1,613
December, 1907							1,694					1,694
January, 1908	139	17	10		173	45	1,592				130	2,106
February, 1908	182						1,858		24		20	2,084
March, 1908	571	30		1	29	53	1,979			110	35	2,808
April, 1908	442						2,571	532				3,545
May, 1908	162						594	178			4	938
June, 1908							408				5	413
Total	1,496	47	10	1	202	98	12,089	5,634	785	110	194	20,666

Lock and date.	Coal.	Cotton seed.	Stone.	Logs.	Lumber.	Staves.	Crossties.	Fertilizer.	Sand.	General and miscellaneous.	Total.
Lock No. 9.											
July, 1907				808	236	438					1,482
August, 1907				620	60	1,283					1,963
September, 1907				620	261	288					1,169
October, 1907			222	912							1,134
November, 1907			867	520	186						1,573
December, 1907			1,694								1,694
January, 1908	139		1,592							52	1,783
February, 1908	182		1,858					60		30	2,130
March, 1908	571	15	1,979					66		13	2,644
April, 1908	442		2,571	312							3,325
May, 1908	162		992	66						54	1,274
June, 1908			408							5	413
Total	1,496	15	12,183	3,858	743	2,009		126		154	20,584

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Commerce—Continued.

[In tons.]

Lock and date.	Coal.	Cotton seed.	Stone.	Logs.	Lumber.	Staves.	Crossties.	Fertilizer.	Sand.	General and miscellaneous.	Total.
Lock No. 10.											
July, 1907	30	.....	488	60	114	.....	.....	.....	.....	.....	642
August, 1907	.....	.....	1,283	.....	93	.....	.....	.....	.....	.....	1,376
September, 1907	.....	.....	1,230	.....	160	.....	.....	.....	.....	.....	1,390
October, 1907	.....	.....	1,483	60	.....	.....	.....	.....	.....	.....	1,543
November, 1907	.....	.....	867	.....	.....	.....	60	.....	.....	.....	927
December, 1907	.....	.....	1,694	100	.....	.....	.....	.....	.....	.....	1,794
January, 1908	139	.....	1,592	.....	.....	.....	.....	.....	.....	.....	1,731
February, 1908	485	.....	2,609	.....	74	.....	.....	120	.....	15	3,303
March, 1908	260	.....	1,218	.....	.....	.....	.....	.....	150	170	1,798
April, 1908	442	50	2,571	5	.....	.....	.....	.....	.....	140	3,208
May, 1908	162	.....	992	66	.....	.....	.....	.....	.....	63	1,283
June, 1908	.....	.....	408	.....	.....	.....	.....	.....	.....	65	473
Total	1,518	50	16,385	291	441	.....	60	120	150	453	19,468

Lock and date.	Coal.	Cotton seed.	Stone.	Logs.	Lumber.	Crossties.	Fertilizer.	General and miscellaneous.	Total.
Lock No. 11.									
July, 1907	103	.....	488	60	114	.....	.....	.....	715
August, 1907	.....	.....	1,283	.....	92	.....	.....	.....	1,375
September, 1907	.....	.....	1,230	.....	160	.....	.....	.....	1,390
October, 1907	.....	.....	1,674	60	.....	.....	.....	.....	1,734
November, 1907	.....	.....	677	.....	.....	60	.....	10	747
December, 1907	.....	.....	1,694	100	3	.....	.....	5	1,802
January, 1908	183	.....	1,592	.....	.....	.....	.....	.....	1,775
February, 1908	524	.....	2,609	.....	74	.....	60	7	3,274
March, 1908	462	.....	2,225	.....	.....	.....	.....	170	2,857
April, 1908	324	5	1,568	5	.....	79	.....	142	2,118
May, 1908	335	.....	992	.....	.....	.....	.....	27	1,354
June, 1908	.....	.....	408	.....	.....	.....	.....	2	410
Total	1,931	5	16,385	225	443	139	60	363	19,551
Lock No. 12.									
July, 1907	103	.....	488	60	114	.....	.....	.....	715
August, 1907	50	.....	1,283	.....	92	.....	.....	.....	1,425
September, 1907	.....	.....	1,230	.....	160	.....	.....	.....	1,390
October, 1907	.....	.....	1,674	60	.....	.....	.....	.....	1,734
November, 1907	.....	.....	677	.....	.....	60	.....	.....	737
December, 1907	.....	.....	1,694	100	3	.....	.....	5	1,802
January, 1908	365	.....	1,764	.....	.....	.....	.....	.....	2,129
February, 1908	342	.....	2,609	.....	74	.....	60	1	3,086
March, 1908	462	.....	2,225	.....	.....	.....	.....	170	2,857
April, 1908	324	5	1,563	5	.....	79	.....	142	2,118
May, 1908	335	.....	992	.....	.....	.....	.....	27	1,354
June, 1908	.....	.....	408	.....	.....	.....	.....	.....	408
Total	1,981	5	16,557	225	443	139	60	345	19,755

Lock and date.	Logs.	Lumber.	Sand.	General and miscellaneous.	Total.
Lock No. 13.					
July, 1907	60	.....	.....	.....	60
August, 1907	.....	260	.....	.....	260
September, 1907	50	.....	.....	.....	50
October, 1907	60	.....	.....	.....	60
November, 1907	.....	.....	.....	.....	.....
December, 1907	304	3	.....	.....	307
January, 1908	40	.....	.....	.....	40
February, 1908	.....	36	.....	.....	36
March, 1908	.....	.....	.....	10	10
April, 1908	12	.....	.....	10	22
May, 1908	.....	4	.....	27	31
June, 1908	.....	.....	40	.....	40
Total	526	303	40	47	916

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Comparative table of commerce through locks.

Items.	Fiscal year ending June 30— 1907.	1908.
Lock No. 7.		
Steamboats.....number..	74	85
Barges.....do....	237	172
Steamboats.....tonnage..	8,289	8,683
Barges.....do....	22,310	15,548
Lockages.....number..	90	59
Freight carried:		
Coal.....tons..	2,587	1,496
Corn.....do....	115	47
Flour.....do....	34	10
Molasses.....do....	.....	1
Cotton.....do....	206	202
Hay.....do....	2	.....
Cotton seed.....do....	202	98
Stone.....do....	14,784	11,785
Oats.....do....	14	.....
Fertilizer.....do....	480	111
Logs.....do....	400	610
Lumber.....do....	2,654	785
General and miscellaneous.....tons..	68	198
Total.....	21,546	15,343
Lock No. 8.		
Steamboats.....number..	192	170
Barges.....do....	394	280
Steamboats.....tonnage..	26,608	17,117
Barges.....do....	34,460	23,098
Passengers.....number..	267	149
Lockages.....do....	228	183
Freight carried:		
Coal.....tons..	2,607	1,496
Corn.....do....	115	47
Flour.....do....	34	10
Molasses.....do....	.....	1
Cotton.....do....	206	202
Hay.....do....	7	.....
Cotton seed.....do....	202	98
Stone.....do....	15,491	12,069
Oats.....do....	17	.....
Fertilizer.....do....	480	110
Logs.....do....	6,200	5,634
Lumber.....do....	2,492	785
General and miscellaneous.....tons..	97	194
Total.....	27,948	20,666
Lock No. 9.		
Steamboats.....number..	63	116
Barges.....do....	232	225
Steamboats.....tonnage..	5,889	9,032
Barges.....do....	21,630	19,154
Lockages.....number..	114	133
Freight carried:		
Coal.....tons..	2,607	1,496
Cotton seed.....do....	.....	15
Stone.....do....	15,491	12,183
Fertilizer.....do....	.....	126
Logs.....do....	1,989	3,858
Lumber.....do....	2,508	743
Staves.....do....	.....	2,009
General and miscellaneous.....tons..	76	154
Total.....	22,671	20,584
Lock No. 10.		
Steamboats.....number..	84	155
Barges.....do....	256	235
Steamboats.....tonnage..	7,762	12,445
Barges.....tonnage..	23,354	18,396
Lockages.....number..	102	252
Freight carried:		
Coal.....tons..	2,772	1,518
Cotton seed.....do....	.....	50
Stone.....do....	16,355	16,385
Logs.....do....	129	291
Lumber.....do....	833	441
Cross ties.....do....	.....	60
Fertilizer.....do....	.....	120
Sand.....do....	.....	150
General and miscellaneous.....tons..	39	453
Total.....	20,128	19,468
Lock No. 11.		
Steamboats.....number..	110	202
Barges.....do....	239	237
Steamboats.....tonnage..	10,194	16,930
Barges.....do....	22,430	20,358
Lockages.....number..	163	345
Freight carried:		
Coal.....tons..	2,728	1,931
Cotton seed.....do....	.....	5
Stone.....do....	16,107	16,385
Logs.....do....	369	225
Lumber.....do....	506	443
Gross ties.....do....	.....	139
Fertilizer.....do....	.....	60
General and miscellaneous.....tons....	20	863
Total.....	19,730	19,551
Lock No. 12.		
Steamboats.....number..	115	220
Barges.....do....	235	237
Steamboats.....tonnage..	10,679	17,564
Barges.....do....	22,130	20,358
Lockages.....number..	194	352
Freight carried:		
Coal.....tons..	2,852	1,961
Cotton seed.....do....	.....	5
Stone.....do....	14,825	16,557
Logs.....do....	189	225
Lumber.....do....	506	443
Cross ties.....do....	.....	139
Fertilizer.....do....	.....	60
General and miscellaneous.....tons..	50	345
Total.....	18,422	19,755
Lock No. 13.		
Steamboats.....number..	.....	28
Barges.....do....	.....	25
Steamboats.....tonnage..	.....	1,088
Barges.....do....	.....	1,295
Passengers.....number..	205	788
Lockages.....do....	90	288
Freight carried:		
Logs.....tons..	149	526
Lumber.....do....	152	303
Sand.....do....	.....	40
General and miscellaneous.....tons..	1	47
Total.....	302	916

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R 5.

IMPROVEMENT OF PASCAGOULA RIVER, MISSISSIPPI.

The U. S. dredge *Barnard* was borrowed from the Mississippi River and reached this port in June, 1907. On the way over a storm was encountered, which wrecked the plant. The dredge was obliged to work part of the time without any pipe line. Despite this, 80,394 cubic yards, place measurement, were removed between July 1 and September 19, 1907, when the *Barnard* was sent to Gulfport.

Arrangements are being made to continue operations under the project, the work from the 10-foot curve inshore to be done under contract, and bids for this part of the work have been advertised for. The *Barnard* will dredge the channel from the 10-foot curve seaward. Two feet overdepth will be allowed in the contract work. As the contractors will dredge a foot or more beyond the allowed overdepth, and as the *Barnard* requires from 3 to 5 feet overdepth for economical operation, the work during the present fiscal year will probably result in a depth of about 20 feet for the full length and part of the width of the channel below the railroad bridge at Scranton. The use made of this will form an excellent basis for an opinion as to the worthiness of increasing the project depth in this channel and at Horn Island Pass.

Money statement.

July 1, 1907, balance unexpended	$150,652.01
June 30, 1908, amount expended during fiscal year for maintenance of improvement	[a] 25,044.68
July 1, 1908, balance unexpended	125,607.33
July 1, 1908, outstanding liabilities	1,500.00
July 1, 1908, balance available	124,107.33
Amount (estimated) required for completion of existing project	360,622.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$200,000.00
For maintenance of improvement	50,000.00
	250,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

March 2, 1827	$8,000.00	August 5, 1886	$20,000.00
May 23, 1828	17,500.00	August 5, 1886 (transferred from Horn Island Pass appropriation)	5,000.00
August 30, 1852	5,000.00	August 11, 1888	27,000.00
June 17, 1878	10,000.00	September 19, 1890	[b] 18,000.00
March 3, 1879	14,000.00		
June 14, 1880	20,000.00		

[a] Does not include $9 expended for Isthmian Canal Commission, to be returned.
[b] Portions of Pascagoula River appropriations applied to dredging work.

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APPROPRIATIONS—continued.

July 13, 1892	[a]$16,200.00	June 30, 1907 (refundment of overpayments)	$4.34
August 18, 1894	[a]7,600.00		
June 3, 1896	[a]1,200.00	Total	849,104.34
March 3, 1899	[b]30,000.00	Less cost of Horn Island Pass dredging in 1897 from appropriations of 1894 and 1896	7,682.40
June 6, 1900	[b]199,600.00		
June 13, 1902	25,000.00	Balance	841,421.94
March 3, 1903	100,000.00		
April 28, 1904	25,000.00		
March 3, 1905	150,000.00		
March 2, 1907	[c]150,000.00		

COMMERCIAL STATISTICS.

The following statement concerning the clearances from the port of Pascagoula for the calendar year ending December 31, 1907, was furnished by the United States custom-house at Pascagoula, Miss.:

Foreign clearances	193
Domestic clearances	10
Net tonnage	93,539
Customs receipts	$4,745

The following statement concerning the commerce of the Pascagoula River for the calendar year ending December 31, 1907, was furnished by the Pascagoula Commercial Club, of Scranton, Miss.:

Articles.	Quantity.	Value.
Arriving:	*Tons.*	
Logs and timber	443,025	$2,140,000
Fish and oysters	1,750	66,000
Miscellaneous	5,302	149,500
Total	450,077	2,355,500
Departing:		
Lumber and timber	538,491	4,944,169
Rosin	2,650	40,000
Turpentine	630	90,000
Charcoal	7,250	150,000
Miscellaneous	3,000	150,000
Total	552,021	5,374,169

Comparative statement showing number of vessels of 500 tons or over and those of 15 to 17 foot draft using the Pascagoula channel during 1906 and 1907.

[Furnished by the Pascagoula Commercial Club.]

	1906.	1907.
Number of vessels over—		
2,000 tons	.....	6
1,800 tons	.....	11
1,600 tons	1	17
1,400 tons	3	19
1,000 tons	13	25
500 tons	15	35
Total	32	113
Total tonnage	55,083	95,100
Average tonnage of all vessels	405	731
Number of vessels of 17-foot draft passing out of channel	8	34
Number of vessels of 15-foot draft or more passing out of channel	49	80

[a] Portions of Pascagoula River appropriations applied to dredging work.
[b] Excluding a total of $88,000 applied to dredging in Horn Island anchorage.
[c] Not including $50,000 diverted to construction of a dredge.

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R 6.

IMPROVEMENT OF PASCAGOULA, LEAF, AND CHICKASAHAY RIVERS, MISSISSIPPI.

(A) PASCAGOULA RIVER.

A few obstructions have been removed during the fiscal year. For data in regard to the construction of a snag boat for this and other improvements, see report on Tombigbee River, mouth to Demopolis.

(B) LEAF RIVER.

No work was done on this stream during the past fiscal year. Available funds will be applied to part of cost of new snag boat and with future appropriations to the work of removing obstructions from the stream in maintenance of the improvement.

(C) CHICKASAHAY RIVER.

The entire river within the limits of the project was worked over, about 75 miles, during the past fiscal year, and about 25 miles of it was worked over twice. The following is a statement of work accomplished:

Overhanging trees removed	1,109
Bushes cut	2,005
Logs and stumps removed from banks and drift piles	2,341
Logs, stumps, and snags removed from river	1,917
Total obstructions removed	7,372

The work done has resulted in clearing most of the obstructions from the mouth of the river up to the railroad bridge at Bucatunna, Miss., the head of the improvement.

Money statements.

PASCAGOULA RIVER.

July 1, 1907, balance unexpended	$9,731.86
June 30, 1908, amount expended during fiscal year for maintenance of improvement	285.33
July 1, 1908, balance unexpended	9,446.53
July 1, 1908, amount covered by uncompleted contracts	6,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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LEAF RIVER.

July 1, 1907, balance unexpended	$3,541.49
June 30, 1908, amount expended during fiscal year for maintenance of improvement	125.00
July 1, 1908, balance unexpended	3,416.49
July 1, 1908, amount covered by uncompleted contracts	1,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	7,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

CHICKASAHAY RIVER.

July 1, 1907, balance unexpended	$3,500.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,127.46
July 1, 1908, balance unexpended	372.54
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	8,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

For Pascagoula River.

March 3, 1881	$4,000	June 3, 1896	[a]$4,800
August 2, 1882	8,000	June 13, 1902 (allotment)	4,000
July 5, 1884	3,000	March 3, 1905 (allotment)	6,750
September 19, 1890	[a]2,000	March 2, 1907 (allotment)	6,000
July 13, 1892	[a]3,800		
August 18, 1894	[a]5,400	Total	47,750

For Leaf River.

September 19, 1890	$5,000	June 13, 1902 (allotment)	$2,250
July 13, 1892	5,000	March 3, 1905 (allotment)	3,250
August 18, 1894	2,500	March 2, 1907 (allotment)	2,500
June 3, 1896	2,500		
March 3, 1899	2,500	Total	25,500

For Chickasahay River.

September 19, 1890	$5,000	June 13, 1902 (allotment)	$2,250
July 13, 1892	5,000	March 3, 1905 (allotment)	2,000
August 18, 1894	5,000	March 2, 1907 (allotment)	1,500
June 3, 1896	2,000		
March 3, 1899	2,500	Total	25,250

COMMERCIAL STATISTICS.

The following statement concerning the commerce of the Pascagoula River and its tributaries, the Leaf and Chickasahay rivers, for the calendar year end-

[a] Portions of the Pascagoula River appropriations applied to snagging work.

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ing December 31, 1907, was furnished by the Pascagoula Commercial Club, of Scranton, Miss.:

Articles.	Quantity.	Value.
Pascagoula River:	*Tons.*	
Logs, lumber, piling, etc.	276,437	$1,367,500
Turpentine	315	45,000
Rosin	1,325	20,000
Charcoal	7,250	150,000
General merchandise	5,000	225,000
Total	290,327	1,807,500
Leaf River:		
Round logs	168,750	750,000
Hewn timber	9,000	80,000
Total	177,750	830,000
Chickasahay River:		
Round logs	151,875	675,000
Sawn and hewn timber	27,000	240,000
Hardwood	1,250	8,000
Total	180,125	923,000

NOTE.—The tonnages of the Leaf and Chickasahay rivers pass down the Pascagoula River, but in the above statements the business originating on each stream is included alone.

R 7.

IMPROVEMENT OF HORN ISLAND PASS, MISSISSIPPI.

During the past fiscal year the U. S. dredge *Charleston* removed 184,017 cubic yards of material from this channel, at a total cost of $16,233.90, all expenditures included.

The work done has resulted in obtaining the full depth and widths authorized by the project. This channel shoals rapidly and requires constant attention to maintain it.

It is proposed to pay half the cost of repairing the *Charleston* from available funds and those estimated as required for the next fiscal year.

Money statement.

July 1, 1907, balance unexpended		$19,782.33
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$10,783.33	
For maintenance of improvement	5,505.57	
		16,288.90
July 1, 1908, balance unexpended		3,493.43
July 1, 1908, outstanding liabilities		827.55
July 1, 1908, balance available		2,665.88
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908		14,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

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APPROPRIATIONS.

August 18, 1894, and June 3, 1896 (allotments)	$7,682.40
March 3, 1899 (allotment, Horn Island anchorage)	20,000.00
June 6, 1900 (allotment, Horn Island anchorage)	68,000.00
March 3, 1905	40,480.00
March 2, 1907	9,000.00
Total	145,162.40

COMMERCIAL STATISTICS.

During the calendar year 1907 about 203 vessels with cargoes passed through Horn Island Pass. The cargoes consisted of about 510,366 tons of lumber and timber, valued at $4,694,169.

The following statement showing the number of deep-draft vessels using Horn Island Pass during 1906 and 1907 was furnished by the Pascagoula Commercial Club, of Scranton, Miss.:

	1906.	1907.
Number of vessels of—		
21 feet draft and over	0	21
20 feet draft or over	7	24
18 feet draft or over	22	34

R 8.

IMPROVEMENT OF HARBOR AT BILOXI, MISSISSIPPI.

Under a contract dated February 26, 1908, with John Andersen, of Gulfport, Miss., maintenance dredging was commenced on March 30, 1908, and was suspended May 12, 1908, on account of the near exhaustion of funds. During this time 62,370.6 cubic yards of material, place measurement, were removed from the channel, resulting in a cut 120 feet wide and 9 feet deep, reaching from the 8-foot contour in front of Biloxi to the 8-foot contour in Mississippi Sound, the length of the channel dredged being 6,666 feet. Dredging will be resumed when funds are available.

Money statement.

July 1, 1907, balance unexpended	$10,696.53
June 30, 1908, amount expended during fiscal year for maintenance of improvement	9,397.92
July 1, 1908, balance unexpended	1,298.61
July 1, 1908, outstanding liabilities	500.00
July 1, 1908, balance available	798.61
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

August 2, 1882	$5,000.00
August 5, 1886	12,500.00
August 11, 1888	18,500.00
September 19, 1890	9,000.00
June 13, 1902	10,000.00
March 3, 1905	9,000.00
March 2, 1907	9,000.00
Total	73,000.00
Less amount turned back into Treasury January, 1896	617.73
Balance	72,382.27

CONTRACT IN FORCE.

With John Andersen, dated February 26, 1908, for dredging in harbor at Biloxi, Miss.; approved by the Chief of Engineers March 7, 1908; 62,370.6 cubic yards, place measurement, removed, at a price of 12¾ cents per cubic yard. Work commenced March 30, 1908, and completed May 12, 1908.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by the Biloxi Commercial Club, Biloxi, Miss.]

Exports and imports.

Articles.	Quantity.	Value.
Exports:	*Tons.*	
Sand	2,000	$4,000
Turpentine	1,080	96,000
Rosin	3,600	72,000
Lumber	200,000	1,200,000
Charcoal	28,350	85,050
Total	235,030	1,457,050
Imports:		
General merchandise	12,000	540,000
Building material	12,500	75,000
Fruit and vegetables	60	2,000
Coal	800	2,500
Cement	500	8,000
Wood	1,000	2,500
Fish and oysters	9,700	580,000
Total	36,550	1,210,000

R 9.

IMPROVEMENT OF HARBOR AT GULFPORT, MISSISSIPPI.

During the past fiscal year the U. S. dredge *Barnard* has removed 1,298,144 cubic yards of material, place measurement, from the channel, at a total cost of $66,534.81, all expenditures included. The experience gained shows that the maintenance of this channel will require the constant presence of a dredge. The necessary annual maintenance is probably 2,000,000 cubic yards. This is increased by the gross abuse of the channel by the local interests, who try to take out vessels drawing 20 to 23 feet, when the channel will carry safely vessels drawing only 19 feet or less. The overdraft vessels go

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aground and stir up great lumps of mud with their propellers. The tow boats constantly run vessels aground on the edge of the channel with no apparent reason therefor and throw large amounts of mud into the channel in pulling off the vessels they have grounded. This results in vastly increasing the annual maintenance. While the basin is ostensibly free, it is for all practicable purposes the private property of the Gulf and Ship Island Railroad, since this road or allied interests own the pier, which is the only possible place for vessels to lie. This pier has to be crossed by the pipe line in dredging. It holds railway tracks of the Gulf and Ship Island Railroad and an electric railway, on both sides of which cars are continually shifted. The pier itself is constructed in a very shoddy manner, and dredging too close to it is liable to cause it to fall in. A portion of the pier once did so. This seriously complicates the work of dredging. All causes combined render the difficulty and amount of work such that if the channel and basin are to be kept open another dredge, in addition to the one provided for the harbors of Mississippi, will need to be provided.

The dredge *Barnard*, borrowed from the Mississippi River, has done pretty good work in this channel. With some alterations she can be made a very successful dredge. The transfer of the *Barnard* and attendant plant to this work and the needful alterations and additions to them are estimated at $215,000. If a dredge is to be provided, this plan is recommended.

Money statement.

July 1, 1907, balance unexpended	$97,151.76
Returned to Treasury to credit of appropriation for operation and care of canals, etc	1,750.09
	95,401.67
June 30, 1908, amount expended during fiscal year for maintenance of improvement	[a] 66,534.81
July 1, 1908, balance unexpended	28,866.86
July 1, 1908, outstanding liabilities	10,600.00
July 1, 1908, balance available	18,266.86
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	200,000.00

APPROPRIATIONS.

July 5, 1884 (allotments)	[b] $22,449.76
June 28, 1902	150,000.00
April 28, 1904 (maintenance)	10,000.00
March 2, 1907	[c] 75,000.00
March 4, 1907 (maintenance)	10,000.00
Total	267,449.76

[a] Does not include $5,575.90 expended for the Quartermaster Department at Fort Morgan in dredging and pumping filling from Mobile Bay onto the reservation, which amount is to be returned to the Gulfport appropriation.

Also does not include $45 expended for the Isthmian Canal Commission, to be returned.

[b] Not including $1,750.09 turned back into Treasury.

[c] Not including $25,000 diverted to construction of dredge.

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COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

Exports and imports.

Articles.	Quantity.	Value.
Exports:	*Tons.*	
Lumber and piling	659,314	$6,838,329
Naval stores	3,047	51,930
Steel culverts and doors	14	2,597
Total	662,375	6,892,856
Imports:		
Mahogany	1,213	18,587
Iron pyrites	4,678	16,357
Creosote oil	2,340	41,850
Total	8,231	76,744

R 10.

IMPROVEMENT OF WOLF AND JORDAN RIVERS, MISSISSIPPI.

Under contract dated December 16, 1907, with the Southern Dredging Company, of Mobile, Ala., 74,021 cubic yards of material, place measurement, were removed from Wolf River and 87,142.2 cubic yards, place measurement, were removed from Jordan River. The work was actually performed by the Home Dredging Company, of Mobile, Ala., and resulted in a channel 8 feet deep and 100 feet wide and 4,340 feet long between the 6.7-foot and 5.3-foot curves in the Wolf River, and a channel 8 feet deep and 100 feet wide and 6,000 long between the 6.7-foot and 5.5-foot curves in Jordan River. Work was suspended April 10, 1908, owing to the near exhaustion of funds.

Money statement.

July 1, 1907, balance unexpended	$30,000.00
June 30, 1908, amount expended during fiscal year, for works of improvement	28,695.19
July 1, 1908, balance unexpended	1,304.81
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATION.

March 2, 1907 ..... $30,000

CONTRACT IN FORCE.

With Southern Dredging Company, dated December 16, 1907, approved by the Chief of Engineers January 30, 1908, for dredging at the mouths of Wolf and Jordan rivers, Miss., at 16 cents per cubic yard, place measurement. Work commenced January 18, 1908, and completed April 10, 1908; 161,163.2 cubic yards of material, measured in place, removed.

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COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

Articles.	Quantity.	Value.
	Tons.	
Lumber	39,364	$283,900
Rosin	2,125	63,850
Turpentine	594	74,250
General merchandise	1,199	76,041
Total	43,282	478,041

R 11.

IMPROVEMENT OF PEARL RIVER BELOW ROCKPORT, MISSISSIPPI.

Between July 18 and December 23, 1907, about 40 miles of river were worked over, and the following is a statement of the work accomplished:

Bank obstructions removed	8,422
Floating obstructions removed	323
Sunken obstructions removed	2,133
Total obstructions removed	10,878

The snag boat *Pearl* was brought to Mobile, where she is being repaired and converted to a self-propelling snag boat. This work is about complete. It is believed that the changes made in this snag boat will enable her to work continuously. Snagging operations will be resumed early in the approaching fiscal year.

Money statement.

July 1, 1907, balance unexpended	$29,182.32
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	4,981.06
July 1, 1908, balance unexpended	24,201.26
July 1, 1908, outstanding liabilities	6,200.00
July 1, 1908, balance available	18,001.26
Amount (estimated) required for completion of existing project	75,798.74
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	20,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

June 14, 1880	$30,000.00	June 3, 1896	$10,000.00
March 3, 1881	25,000.00	March 3, 1899	7,000.00
August 2, 1882	15,000.00	June 13, 1902	7,000.00
July 5, 1884	10,000.00	June 13, 1902 (allotment)	1,286.39
August 5, 1886	13,125.00	March 3, 1905	7,000.00
August 11, 1888	10,000.00	March 2, 1907	30,000.00
September 19, 1890	15,000.00		
July 13, 1892	15,000.00	Total	200,411.39
August 18, 1894	5,000.00		

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COMMERCIAL STATISTICS.

During the calendar year ending December 31, 1907, 40,887 tons of logs and timbers, valued at $422,247, were brought down this river. Quite a good deal of other commerce used the stream, for which no definite figures could be obtained.

R 12.

IMPROVEMENT OF PEARL RIVER BETWEEN EDINBURG AND JACKSON, MISSISSIPPI.

During the past year, between July 13 and December 30, about 71½ miles of river were worked over, from Jackson, Miss., to a point 71½ miles above. The following is a statement of work done:

Bank obstructions removed	4,209
Floating obstructions removed	527
Sunken obstructions removed	3,603
Total	8,339

With available funds it is proposed to continue this work.

During the past year $2,285.02 was expended, all applied to maintenance.

Money statement.

July 1, 1907, balance unexpended	$4,734.71
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	2,285.02
July 1, 1908, balance unexpended	2,449.69
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

CARTHAGE TO JACKSON.

March 3, 1879	$6,000	July 13, 1892	$5,000
June 14, 1880	7,500	August 18, 1894	2,400
March 3, 1881	2,500	June 3, 1896	2,400
August 2, 1882	2,500	March 3, 1899	2,500
August 6, 1886	2,250		
August 11, 1888	2,500	Total	38,550
September 19, 1890	3,000		

EDINBURG TO CARTHAGE.

July 5, 1884	$2,500	August 18, 1894 (maintenance)	$500
August 5, 1886	2,250	June 3, 1896 (maintenance)	500
August 11, 1888	5,000	March 3, 1899 (maintenance)	1,000
September 19, 1890	5,000		
July 13, 1892 (maintenance)	500	Total	17,250

EDINBURG TO JACKSON.

June 13, 1902	$3,000
March 3, 1905	4,000
March 2, 1907	3,500
Total	10,500

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COMMERCIAL STATISTICS.

The only commerce reported for this section for the calendar year 1907 was 340 tons of general merchandise, valued at $10,000, though there was much more upon which no definite figures were obtained.

R 13.

DREDGE FOR HARBORS ON COAST OF MISSISSIPPI.

As provided for in the river and harbor act of March 2, 1907, the sum of $25,000 has been transferred from the appropriation for Gulfport Harbor and $50,000 from that for Pascagoula River, to be used, with the appropriation carried by the sundry civil bill of May 27, 1908, amounting to $125,000, in the construction of a dredge for the harbors above mentioned, which, with the attendant plant, is estimated will cost $200,000.

Plans and specifications are almost complete for the dredge, and bids for its construction under contract will be invited when they are ready. Attendant plant will be constructed under contract or with hired labor, as may be most economical and advantageous to the United States.

Money statement.

July 1, 1907, balance unexpended	$75,000.00
Amount appropriated by sundry civil act approved May 27, 1908	125,000.00
July 1, 1908, balance unexpended	200,000.00
July 1, 1908, outstanding liabilities	500.00
July 1, 1908, balance available	199,500.00

APPROPRIATIONS.

March 2, 1907 (allotment)	$75,000
May 27, 1908	125,000
Total	200,000

R 14.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

Under date of May 25, 1906, an allotment of $3,800 was made from the above-named appropriation to be applied to the removal of the wreck of a sunken dry dock from Mobile River, Alabama. At the beginning of the fiscal year a contract had been entered into for the work, but the work had been only commenced. During the past fiscal year all logs and deposit have been removed from on top and inside the dock, and preparations are now being made to raise the dock and remove it from the river.

CONTRACT IN FORCE.

With Robert Middleton, dated October 8, 1906 (emergency contract), for removing sunken dry dock from Mobile River, Alabama, for the sum of $3,700. Work was commenced November 8, 1906, and was to have been completed by February 8, 1907, but time limit was extended.

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APPENDIX S.

IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST NEW ORLEANS, LOUISIANA, DISTRICT.

REPORT OF COL. E. H. RUFFNER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Closing crevasse in Pass a Loutre, Mississippi River.
2. Southwest Pass, Mississippi River.
3. Examinations and surveys at South Pass, Mississippi River.
4. Maintenance and improvement of South Pass channel, Mississippi River.
5. Bayou Lafourche, Louisiana.
6. Bayou Teche, Louisiana.
7. Removing sunken vessels or craft obstructing or endangering navigation: Indefinite.

ENGINEER OFFICE, UNITED STATES ARMY,
New Orleans, La., July 8, 1908.

SIR: I have the honor to submit herewith annual reports upon works of river and harbor improvement for this district for the fiscal year ended June 30, 1908.

Very respectfully,

E. H. RUFFNER,
Colonel, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

S 1.

CLOSING CREVASSE IN PASS A LOUTRE, MISSISSIPPI RIVER.

For details of location, progress, and completion of a dam for closing this crevasse, see page 1487, Annual Report of the Chief of Engineers for 1898, and page 1839 of Report of 1899.

This crevasse is gradually closing. This tendency was augmented by the effect of the mattress sill across Pass a Loutre. The material composing the dam, which was built for closing this crevasse, is rapidly decaying, but on account of the land formation above and below it this is not deemed of consequence.

Specifications for constructing sill across "Cubit's Gap" and "The Jump" and placing additional mattresses on and building up the sill across the head of Pass a Loutre, Mississippi River, were approved by

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the Chief of Engineers May 17, 1907. The Secretary of War autho
ized May 25, 1907, the use of the balance remaining from the appr
priation of February 26, 1897, for "closing crevasse in Pass a Lout
Mississippi River," $21,029.92, toward the construction of the s
contemplated by the above-named specifications, the balance of t
expenses of the work to be paid from the appropriation for improvi
Southwest Pass, Mississippi River. Bids were opened for this wo
July 6, 1907, and contract entered into July 27, 1907, with Christie
Lowe for doing the work. The work was begun October 21, 19
and completed April 15, 1908. A total of 98,500 square yards of m
tress and 22,162.5 tons of stone were placed in the work. The to
amount earned by the contractors was $202,540.64, of which the su
of $21,029.92 was paid from this appropriation and $181,510.72 fr
the appropriation for improving Southwest Pass, Mississippi Riv

Money statement.

July 1, 1907, balance unexpended	$21,029.
June 30, 1908, amount expended during fiscal year	21,029.

S 2.

IMPROVEMENT OF SOUTHWEST PASS, MISSISSIPPI RIVER.

For progress of the work, see pages 1882, 1431, and 1296, Annu
Reports of the Chief of Engineers for 1904, 1905, 1906, and pa
1400 for 1907, respectively.

During the fiscal year ending June 30, 1908, 19,444⅔ square yar
of mattress, held in place by 8,170.1 tons of stone; 13,091⅓ yards
burlap, and 20,260.17 cubic yards of concrete were placed in th
work.

The work under contract for construction of the jetties was co
pleted January 5, 1908.

The following table gives the amount of work done in the co
struction of the jetties:

Location.	Square yards of mattress.	Tons of stone on mattresses.	Tons of stone as foundation for concrete.	Cubic yards of concrete.	Yards of burlap.	Numb of sack
East jetty	638,119⅓	152,300.54	47,377.23	26,820.05	14,670	
West jetty	448,432	87,063.77	41,685.49	17,690.08	11,305⅓	
Total	1,086,551⅓	239,364.31	89,062.72	44,510.13	25,975⅓	

The total amount earned by the contractor under this contract w
$2,629,753.85.

Progress chart accompanying the report for last year furnish
concise information of the work done in constructing the jetties, e
cept in the item of concrete, and this it will be understood extend
to station 21.000 on the east jetty and 15,000 on the west jetty.

A total of $191,632.25 was expended during the fiscal year in co
nection with jetty construction. This includes $18,639.11 retaine
percentage June 30, 1907.

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A total of $147,837.19 was expended during the past fiscal year for operation of dredges on this improvement, and $120,670.58 were expended for office expense and engineering contingencies and repairs to plant.

Plans and specifications for constructing sill across Cubits Gap and The Jump and placing additional mattresses on and building up the sill across the head of Pass a Loutre, Mississippi River, were approved by the department May 17, 1907, and the Secretary of War authorized, May 25, 1907, the application of the remaining balance of $21,029.92 of the appropriation by act approved February 26, 1897, for "Closing crevasse in Pass a Loutre, Mississippi River," toward part payment for the work. A contract for doing the work was entered into July 27, 1907, with Christie & Lowe, New Orleans, La. Work under the contract was begun October 21, 1907, and completed April 15, 1908. A total of 98,500 square yards of mattresses and 22,162.5 tons of stone were placed, the contractors earning $202,540.64.

Specifications for dredging 22,400 feet of the channel at the mouth of Southwest Pass to secure a depth of 35 feet at mean low tide, for a width of 500 feet, involving the removal of about 3,396,000 cubic yards of material, were approved August 2, 1907, and a contract for doing the work was entered into September 26, 1907, at 14 cents per cubic yard. The estimated cost of the work under this contract is $475,440. Work under this contract was begun November 13, 1907, and to the end of the fiscal year 633,954 cubic yards of material had been removed from section 1 and 1,008,239 cubic yards of material had been removed from section 2. The total amount earned by the contractors for work on these two sections was $216,210.18. On account of difficulties experienced by the contractors in managing their pipe line in a strong current, it became necessary to enter into a supplemental contract April 3, 1908, modifying the original contract, so as to permit of payment to the contractors for the actual number of cubic yards of material removed from section 1, providing that before the river reaches a stage of 9 feet by the Carrollton gauge the contractor shall return to section 1 and remove all material, so as to secure the full width of 500 feet at the bottom with natural slopes, and full depth of 35 feet at mean low water. The consideration flowing to the United States under this supplemental contract was the reduction in price of material removed from 14 cents to 13 cents per cubic yard, and a further reduction to 6½ cents per cubic yard for certain material dredged between 35 and 36 feet below mean low water.

A contract was entered into May 4, 1908, with the Jahncke Navigation Company, New Orleans, La., for hire of a dredge for use in removing a mattress sill across the head of Southwest Pass, Mississippi River, the total consideration being $213 per day for each day the plant is used. Work under this contract had not been begun at the end of the fiscal year.

A contract was entered into May 8, 1908, with the Penn Bridge Company, Beaver Falls, Pa., for constructing a steel frame building at Burrwood, La., the total consideration being $12,400. Actual construction had not been begun at the end of the fiscal year. This

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contract provides that the work shall be completed November 4, 1908.

Bids for constructing reinforced concrete buildings at Burrwood, La., were opened May 8, 1908. The following bids were received:

Doullut & Williams, New Orleans, La	$55,114
John Reusch, New Orleans, La	76,237

Both these bids were rejected as excessive.

The proposed work is being readvertised, bids to be opened July 8, 1908.

The following extract from the report of Mr. Cornelius Donovan, assistant engineer, gives a complete résumé of the operations of the dredges, etc., during the fiscal year:

During the year 19,444⅞ square yards of mattress, 8,170.10 tons of stone, 13,091⅛ yards of burlap, and 20,260.17 cubic yards of concrete were placed in the jetties. The seven mattresses were placed in the east jetty beyond station 21000, at which point the jetty is built above the surface of the water, and are a protection to the end of that jetty; 602.32 tons of the stone used completed the revetment around the sea end of both jetties.

The mattress work was completed in September, 1907, and the entire work, in accordance with contract with Christie & Lowe, was completed January 4, 1908.

The total amount of work done in the construction of the jetties is as follows: 1,086,551⅛ square yards of mattress, 328,427.03 tons of stone, 44,510.13 cubic yards of concrete, 25,975⅛ yards of burlap, and 61 sacks.

The total cost of the above was $2,629,753.85, which is $10,731.73 less than the estimated cost.

Subsidence of the jetties.—In ten months the mean subsidence of the east jetty, as determined by levels taken on the concrete superstructure, between stations 5600 and 17500 was 0.24 of a foot, the greatest subsidence being 2.42 feet, at station 15900. The two places at stations 7000 and 7400, mentioned in the last annual report as having settled 12½ feet and 4 feet, respectively, have settled but a small amount during the year.

Since placing the concrete superstructure on the west jetty the average subsidence has been 0.9 of a foot, and the average during the past five months was 0.16 of a foot.

The settlement in both jetties is to some extent due to the compression of the mattress superstructure, and is also influenced by the weight of material deposited on the sea side of both jetties.

Dredging.—The *Benyaurd* operated in Southwest Pass channel during the year, except during the month of July, when under repairs, and during the month of September and 22 days in October, when it operated in South Pass.

During the month of April dredging was done on 26 days, and 189,436 cubic yards of material was removed at a field cost of 5.2 cents per cubic yard. This dredge is operating most successfully.

The dredge *General Abbot* was under repairs from July 13 to November 13, 1907, and since the latter date operated 102 days in South Pass and 56 days in Southwest Pass.

The dredge *St. Johns* arrived at Southwest Pass April 12, 1908, in an unserviceable condition. It was operated 19 days during the months of April and May. On the 25th of May this dredge arrived in New Orleans for extensive general repairs, and on May 29 was put in the naval dock, where it now is.

The above-mentioned dredges worked mostly in the channel between the jetties from station 2000 to 9000, west jetty, and in the channel beyond the ends of the jetties. At the former locality the channel depth was increased about 6 feet.

In January of this year there was a navigable depth of 31½ feet in the channel beyond the ends of the jetties, but during the present high river this shoaled to a depth of 23 feet for a distance of 250 feet. Otherwise there is an available depth of 26 feet in this channel. It may improve as the river falls and the amount of sediment carried in suspension decreases.

A chart, herewith, of 7 miles of the channel from deep water in the pass to deep water in the Gulf gives in detail the depths at every locality. The survey was made at a time when changes were constantly taking place, and therefore

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abnormal condition of the channel is shown. A more normal condition will ain as the river approaches a low stage.

DREDGING BY THE BOWERS' SOUTHERN DREDGING COMPANY.

nder a contract entered into with this company September 26, 1907, they were redge a channel 22,400 feet long, 500 feet wide, with a depth of 35 feet at n low water. This contract was to have been completed May 20, 1908.
he contractor was urged to get his dredges, three in number, at work as as possible so as to take advantage of the low-water stage. His attention called to the great difficulty he would experience in holding his pipe line, 0 to 2,200 feet in length, against the strong current during the high stage of river, and particularly if the river was carrying much drift. He seemed dent, however, that he would experience little difficulty, but later on real- how serious his mistake was.
he first dredge began operation November 12, 1907, the second December 27, the third about April 4. Up to the end of this fiscal year the total working of the three dredges was 46 weeks, an average of 15 weeks each. This is t one-half the time that would have been made if all had begun dredging November 12, and favorable conditions had prevailed.
he contractor found it impossible to complete section 1, and on April 3 a plemental contract was entered into by the terms of which he was paid for terial removed from that section up to a certain date, and subsequently he complete that section. In the meantime work was continued in section 2, that section completed. Dredging is now being done in section 3.
nder this contract 1,642,193 cubic yards of material were removed, at a cost $16,210.18.
A chart, herewith, of 7 miles of the channel from deep water in the pass to ep water in the Gulf gives in detail the depth at every locality. The survey s made at a time when changes were constantly taking place, and therefore abnormal condition of the channel is shown. A more normal condition may ain as the river approaches a low stage.

PERMANENT PLANT.

Coaling station.—During the year a plant for coaling dredges was completed. is consists of a wharf 70 by 120 feet, on which the coal is stored, and elevated s which are filled by means of a bucket operated by a derrick. The storage pacity is 2,000 tons, and the coal is handled to the dredges at the rate of out 120 tons per hour.

Wharf.—A wharf 62½ by 352 feet was completed. On a portion of this will e constructed a building 30 by 240 feet under one roof, and divided into com- rtments to be used as machine shop, storehouse, carpenter shop, ice plant, l house and boiler room.

A contract for the erection of this building has been made with the Penn ridge Company under the terms of which it should be completed on Novem- r 8.

Office and dwellings.—Foundations of creosoted piles have been completed for n office building and sixteen dwellings, and plans and specifications prepared r the same.

Closing bayous.—Plans and specifications were made, and forwarded to the epartment for approval, for closing eleven outlet bayous in Southwest Pass y means of Wakefield sheet piling.

Placing additional mattresses on the sill across the head of Pass a Loutre, constructing a sill across Cubits Gap and The Jump.—Under a contract with Messrs. Christie & Lowe this work was commenced October 21, 1907, and com- leted April 15, 1908.

All mattresses, with one exception, in Pass a Loutre sill, were 100 feet wide nd 2 feet thick, and generally 200 feet long. The amount of stone to hold them n place was 50 pounds to the square foot.

Beginning 100 feet from the extreme west end the Pass a Loutre sill was aised 4 feet for a distance of 600 feet by two tiers of mattresses, thence for a distance of 800 feet it was raised 2 feet. One mattress 50 by 200 feet was placed nearly parallel to upper dam, and two others side by side; one resting against upper dam covered the smaller to reduce the depth over the original sill.

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The sill across Cubits Gap was built in two parts extending main shore to an island the head of which is 2,700 feet from the ent gap. The aggregate length of sill covering the two sections is 5,476

The sill across The Jump is placed 3,000 feet from its head and in length.

In these constructions 98,500 square yards of mattress and 22,1 stone were used. The total cost was $202,540.64, which was $7,653.7 the estimated cost, made before the lines were accurately establish more than the estimate after the lines were definitely determined u

Money statement.

July 1, 1907, balance unexpended	$1,
Amount appropriated by sundry civil act approved May 27, 1908	1,
Miscellaneous receipts deposited to credit appropriation during fiscal year	
	2
June 30, 1908, amount expended during fiscal year for works of improvement	
July 1, 1908, balance unexpended	1,
July 1, 1908, outstanding liabilities	
July 1, 1908, balance available	1,
July 1, 1908, amount covered by uncompleted contracts	
Amount (estimated) required for completion of existing project	
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATIONS.

June 13, 1902	$
March 3, 1903	1,
March 3, 1905	1,
June 30, 1906	
March 2, 1907	1,
May 27, 1908	1,
	5,
Miscellaneous receipts deposited to credit of the appropriations	
	5,
Transferred to appropriation for maintenance of South Pass channel, Mississippi River, 1906	
Total	5,

ABSTRACT OF CONTRACTS IN FORCE DURING FISCAL YEAR ENDING 1908.

I.

Name and address of contractor: Christie & Lowe, Chicago, Ill.

Work: Constructing two jetties at the mouth of Southwest Pass, Mi River. As modified by supplemental contract dated July 18, 1905, app the Secretary of War July 31, 1905, includes the following estimated q of materials: Brush mattress, 1,094,993 square yards; riprap stone, tons; concrete, 49,343 cubic yards.

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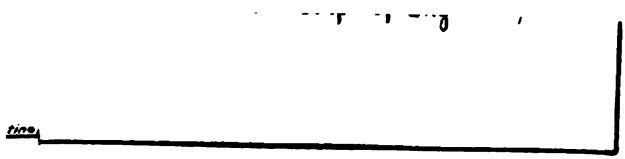

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Contract price: Brush mattress, 96 cents per square yard; riprap stone, $4 per ton; concrete, $6.10 per cubic yard.
Date of contract: July 16, 1903.
Date of approval: July 31, 1903.
Date of commencement: October 2, 1903.
Date of expiration: August 3, 1907.
Work completed: January 4, 1908.

II.

Name and address of contractor: Joseph Edwards & Co., New York City.
Work: Furnishing cast-steel elbows and sleeves for the U. S. dredge *Benyaurd*.
Contract price: Elbows, $232.50 each and sleeves $258 for the first sleeve and $230 each for subsequent ones.
Date of contract: December 19, 1906.
Date of approval: Emergency contract.
Date of commencement: December 19, 1906.
Date of expiration: December 18, 1907.

III.

Name and address of contractor: The Cudahy Packing Company (Limited), New Orleans, La.
Work: Furnishing fresh meat for use of dredges for period of six months from date of contract.

Contract prices.

Articles.	Estimated quantity.	Unit price.
Beef:		
Fresh western, hind quarters	10,000 pounds	$8.25
Fresh western, fore quarters	4,000 pounds	4.50
Fresh western, sides	500 pounds	6.65
Mutton, fresh, whole carcasses	1,000 pounds	10.10
Veal, fresh, whole carcasses	1,500 pounds	7.45
Pork shoulders, fresh (boxes)	1,200 pounds	10.10
Pork loins, fresh (boxes)	1,000 pounds	12.65
Sausage:		
Bologna (25s)	500 pounds	6.00
Pork link (5s and 15s)	300 pounds	9.00
Wienerwurst (10s)	100 pounds	9.00
Tripe, pickled (15s)	20 kits	.75
Spare ribs, half barrels (100s)	6 half barrels	7.50

Less a deduction of 6 per cent from above prices for New Orleans delivery. (See Paragraph X.)

Date of contract: January 7, 1907.
Date of approval: Emergency contract.
Date of commencement: January 7, 1907.
Date of expiration: July 6, 1907.

IV.

Name and address of contractor: W. G. Coyle & Co., New Orleans, La.
Work: Furnishing and delivering about 225,000 barrels of coal for use of dredges.
Contract price: Delivered in yards at South or Southwest Passes, 40.95 cents per barrel; delivered in bunkers of dredges at New Orleans, 40.45 cents per barrel; delivered in Government barges, including towing from and to Southwest and South Pass, 47.45 cents per barrel.
Date of contract: February 23, 1907.
Date of approval: March 2, 1907.
Date of expiration: February 23, 1908.

V.

Name and address of contractor: Woodward, Wight & Co. (Limited), New Orleans, La.
Work: Furnishing and delivering subsistence supplies, etc., for use of dredges.

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Contract prices.

Articles.	Designation.	Estimated quantity.	Unit price.
Allspice, ground	Pounds	2	$0.25
Apples:			
Evaporated	do	400	.07½
Canned	Dozen	18	.90
Bacon, breakfast	Pounds	1,000	.17
Barley	do	80	.04
Bay leaves	do	1	.30
Beans:			
Red kidney	do	400	.04½
White navy	do	800	.03
Lima	do	300	.05½
Canned, string	Dozen	40	.72½
Boston baked	do	4	.85
Beef:			
Corned, in barrels	Number	3	12.00
Corned, in half barrels	do	20	6.50
Corned, in 14-pound cans	Dozen	3	17.75
Blackberries, canned	do	20	.85
Bluing	Gross	2	1.20
Bread, pilot	Pounds	200	.06½
Butter:			
Elgin creamery	do	1,200	.28
Choice dairy	do	700	.22
Cabbage	do	2,000	.02½
Catsup:			
Tomato, "Blue Label" or equal	Pints	50	.21
Tomato, "Marx's" or equal	Gallons	40	1.10
Charcoal	Sacks	20	.95
Cheese:			
American, or equal	Pounds	400	.16
Italian	do	20	.30
Chowchow:			
American	Gallons	20	.70
Cross & Blackwell, or equal	Pints	14	.29
Citron	Pounds	2	.25
Cinnamon, ground	do	4	.27
Cloves, whole	do	2	.20
Cocoanut, shredded	do	80	.20
Codfish	do	700	.06½
Coffee:			
Parched, dark roast	do	1,500	.15
Parched, ground	do	800	.15½
Coke, gas	Sacks	4	.75
Corn, sugar, 2 dozen cans to case	Dozen	30	.80
Crackers, soda, 20 pounds to box	Pounds	500	.07
Cracker dust, loose	do	10	.06½
Cranberry sauce	do	24	.06½
Cream, canned	Dozen	80	.85
Currants	Pounds	20	.09
Curry powders	do	2	.50
Eggs	Dozen	1,500	.21
Extract:			
Vanilla, Dixie, Adams, or equal	Pints	20	1.00
Lemon, Dixie, Adams, or equal	do	10	1.00
Vanilla, Price or equal	Bottles	5	.56
Lemon, Price or equal	do	5	.33
Flour:			
Wheat, in barrels	Number	50	4.95
Buckwheat	Pounds	100	.05½
Graham	do	40	.05
Rye	do	100	.03½
Garlic	do	100	.09
Gelatine	Packages	24	1.20
Ginger, ground	Pounds	2	.25
Grits, coarse	do	1,000	.01½
Ham	do	1,500	.16
Hominy	do	50	.02½
Jelly:			
California	Dozen	8	1.85
American	Pounds	180	.03
Kraut	Gallons	40	.60
Canned	Dozen	20	.85
Lard	Pounds	800	.12½
Stearine	do	30	.18
Lemons, 30 dozen to box	Boxes	10	3.75
Lemons	Dozen	20	.20
Lye	do	24	.70
Macaroni	Pounds	100	.04½
Mince-meat, evaporated	Dozen	12	12.00
Mince-meat	Pounds	150	.08½
Mackerel	do	600	.13

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Contract prices—Continued.

Articles.	Designation.	Estimated quantity.	Unit price.
Matches, safety	Gross	10	$0.60
Meal	Pounds	100	.01½
Milk, condensed	Dozen	180	1.10
Molasses	Gallons	20	.45
Mustard	Pounds	10	.29
Mace	do	1	.35
Nutmeg, whole	Ounces	32	.03
Oatmeal	Dozen	18	1.05
Oil, olive	Quarts	20	.40
Okra, canned	Dozen	18	.77½
Onions	Pounds	2,000	.02½
Paper, toilet	Rolls	400	.03½
Peaches:			
Evaporated	Pounds	200	.12½
Canned	Dozen	16	1.90
Pears, canned	do	6	1.90
Peas:			
Small May, Numsen, or equal	do	40	1.97½
Green	Pounds	200	.02½
Split	do	100	.04½
Pepper:			
Black ground	do	40	.26
Chili	do	50	.20
Cayenne	do	2	.28
Pickles, mixed	Gallons	30	.47½
Pie fruit	Dozen	12	1.00
Pigs feet, in half barrels	Number	6	3.60
Potatoes:			
Irish	Bushels	300	1.00
Sweet yams	Pounds	1,000	.03
Sweet	Dozen	4	1.00
Powder:			
Baking	Pounds	40	.40
Washing	Dozen	24	1.12½
Prunes, dried	Pounds	400	.07½
Pumpkin, canned	Dozen	4	.95
Raisins, seeded	Pounds	150	.08½
Rice	do	1,000	.04½
Sage	do	1	.36
Sago	do	40	.07½
Salmon	Dozen	24	1.27½
Salt:			
Table	Pounds	400	.00175
Coarse	do	3,000	.01
Sapolio, or hand sapolio	Boxes	6	4.50
Sauce:			
Pepper, American	Bottles	10	.18
Worcestershire, Lea & Perrin	Pints	50	.40
Worcestershire, Marx's, or equal	Gallons	30	.95
Shoulders	Pounds	1,200	.09½
Soap:			
Ivory	Boxes	6	4.00
Grand-Pa's Wonder	do	8	3.90
Octagon	do	15	3.95
Olive	do	6	2.30
Soda:			
Cooking	Pounds	10	.06
Washing	do	120	.02
Spaghetti	do	100	.04
Starch:			
Corn	do	50	.05½
Laundry	do	40	.04
Sugar:			
Standard granulated	do	4,000	.049
Yellow clarified	do	500	.047
Open kettle	do	100	.042
Powdered	do	60	.06
Tapioca	do	60	.08
Tea, "To-Kay" or equal	do	150	.35
Thyme	do	2	.28
Tomatoes	Dozen	80	1.15
Vermicelli	Pounds	100	.06½
Vinegar, cider	Gallons	40	.25
Yeast, Fleishman's Compressed	Pounds	20	.50
Yeast cakes	Boxes	10	.65

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Deliveries of the articles described and enumerated at the unit prices quoted f. o. b., South Pass and Southwest Pass, Mississippi River, and will deduct 1 per cent from the unit prices quoted for deliveries f. o. b., city limits, New Orleans, La.

Date of contract: March 1, 1907.
Date of approval: Emergency contract.
Date of commencement: March 1, 1907.
Date of expiration: August 31, 1907.

VI.

Name and address of contractor: Stern Foundry and Machinery Company, New Orleans, La.

Work: Furnishing coal chutes for use in connection with coaling station at Southwest Pass, Mississippi River.

Contract price: $154.46.
Date of contract: May 21, 1907.
Date of approval: Emergency contract.
Date of commencement: May 21, 1907.
Date of expiration: June 21, 1907. Contract completed October 8, 1907. Contractor was ready to make delivery at the end of thirty days, in accordance with the contract, but was requested not to do so because the United States was not ready to receive the coal chutes on the dock at Southwest Pass.

VII.

Name and address of contractor: Woodward, Wight & Co., Limited, New Orleans, La.

Work: Furnishing bolts, nuts, washers, rope, etc., for use in connection with construction of coaling station at Southwest Pass, Mississippi River.

Contract price: $407.24.
Date of contract: May 21, 1907.
Date of approval: Emergency contract.
Date of commencement: May 21, 1907.
Date of expiration: July 21, 1907.

VIII.

Name and address of contractor: The Fairbanks Company, New Orleans, La.

Work: Furnishing and delivering hoisting engine, etc., for use at Southwest Pass, Mississippi River.

Contract price: $2,800.
Date of contract: May 29, 1907.
Date of approval: Emergency contract.
Date of commencement: May 29, 1907.
Date of expiration: July 28, 1907.

IX.

Name and address of contractor: Gulfport Creosoting Company, Gulfport, Miss.

Work: Furnishing piles, lumber, and timber for use in connection with construction of coaling station at Southwest Pass, Mississippi River.

Contract price: $7,830.64.
Date of contract: May 22, 1907.
Date of approval: June 11, 1907.
Date of commencement: June 14, 1907.
Date of expiration: July 29, 1907.

X.

Name and address of contractor: The Cudahy Packing Company of Louisiana, New Orleans, La.

Work: Furnishing fresh meat for use of dredges for a period of six months from date of contract.

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Contract prices.

Articles.	Estimated quantity.	Unit price.
Beef:		
Fresh western, hind quarters	10,000 pounds	$0.0775
Fresh western, fore quarters	4,000 pounds	.04
Fresh western sides	500 pounds	.0585
Mutton, fresh, whole carcasses	1,000 pounds	.09
Veal, fresh, whole carcasses	1,500 pounds	.075
Pork shoulders, fresh (boxes)	1,250 pounds	.10
Pork loins	1,000 pounds	.125
Sausage:		
Bologna (25s)	500 pounds	.06
Pork link (5s and 15s)	300 pounds	.09
Wienerwurst (10s)	100 pounds	.09
Tripe, pickled (15s)	20 kits	.75
Spare ribs, half barrels (100s)	6 half barrels	6.75

Less a deduction of 7 per cent from above prices for New Orleans delivery.
Date of contract: July 8, 1907.
Date of approval: Emergency contract.
Date of commencement: July 8, 1907.
Date of expiration. January 7, 1908.

XI.

Name and address of contractor: Ellicott Machine Company, Baltimore, Md.
Work: Furnishing cast-steel ball and socket joints for dredge *Benyaurd.*
Contract price: $344 per joint.
Date of contract: July 9, 1907.
Date of approval: Emergency contract.
Date of commencement: July 9, 1907.
Date of expiration: December 29, 1907.

XII.

Name and address of contractor: Christie & Lowe, New Orleans, La.
Work: Constructing sill across Cubit's Gap and The Jump and placing additional mattresses on the sill across Pass a Loutre, Mississippi River.
Contract price: $210,194.20.
Date of contract: July 27, 1907.
Date of approval, Augut 1, 1907.
Date of commencement: October 21, 1907.
Date of expiration: September 3, 1908.
Work completed: April 15, 1908.

XIII.

Name and address of contractor: James G. Swarbrick, New Orleans, La.
Work: Furnishing subsistence supplies, etc., for use of dredges, etc., for a period of seven months, from September 1, 1907, to March 30, 1908.

Contract prices.

Article.	Unit of quantity.	Unit price.
Allspice	Pound	$0.25
Apples:		
Evaporated	do	.07½
Canned, 3s	Dozen	.90
Bacon, breakfast	Pound	.15½
Barley	do	.03½
Bay leaves	do	.30
Beans:		
Red kidney	do	.05½
White navy	do	.03½
Lima	do	.05½
Canned string, 2s	Dozen	.70
Boston baked, 3s	do	.92½

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Contract prices—Continued.

Article.	Unit of quantity.	Unit pri
Beef:		
Corned	Barrel	$12.
	Half barrel	6.
Corned, 14s	Dozen	17.
Blackberries, canned, 2s	do	
Bluing	Gross	1.
Bread, pilot	Pound	
Butter:		
Creamery	do	
Dairy	do	
Cabbage	do	
Catsup	Pints	
Do	Gallon	1.
Charcoal	Sack	
Cheese:		
American	Pound	
Italian	do	
Chowchow:		
American	Gallon	
Cross & Blackwell, or equal	Pint	
Citron	Pound	
Cinnamon	do	
Cloves	do	
Cocoanut, shredded	do	
Codfish	do	
Coffee:		
Parched	do	
Ground	do	
Coke, gas	Sack	
Corn, canned	Dozen	
Crackers	Pound	
Cracker dust	do	
Cranberry sauce	do	
Cream, canned	Dozen	
Currants	Pound	
Curry powders	do	
Eggs	Dozen	
Extract:		
Vanilla	Pint	1.
Lemon	do	1.
Vanilla (4-ounce)	Bottle	
Lemon (4-ounce)	do	
Flour:		
Wheat	Barrel	4.
Do	Half-barrel	2.
Buckwheat	Pound	
Graham	do	
Rye	do	
Garlic	do	
Gelatine	Package, dozen	1.
Ginger	Pound	
Grits	do	
Ham	do	
Hominy	do	
Jelly:		
California	Dozen	1.
American	Pound	
Kraut	Gallon	
Canned	Dozen	
Lard	Pound	
Stearin	do	
Lemons	Box	4.
Do	Dozen	
Lye	do	
Macaroni	Pound	
Mincemeat	Dozen	1.
Do	Pound	
Mackerel	do	
Matches	Gross	
Meal	Pound	
Milk	Dozen	1.
Molasses	Gallon	
Mustard	Pound	
Mace	do	
Nutmegs	Ounce	
Oatmeal	Dozen	1.
Oil, olive	Quart	
Okra	Dozen	
Onions	Pound	
Paper, toilet	Roll	
Peaches, evaporated	Pound	
Peaches, 3s	Dozen	1.

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Contract prices—Continued.

Article.	Unit of quantity.	Unit price.
Pears	Dozen	$1.75
Peas, 2s	....do	.95
Green	Pound	.02½
Split	....do	.04
Pepper:		
Black	....do	.20
Chili	....do	.20
Cayenne	....do	.24
Pickles	Gallon	.45
Pie fruit	Dozen	.95
Pig's feet	Half-barrel	3.15
Potatoes:		
Irish	Bushel	1.15
Sweet	Pound	.03½
Canned sweet	Dozen	1.00
Powder:		
Baking	Pound	.40
Washing	Dozen packages	4.50
Prunes	Pound	.08
Pumpkin	Dozen	.85
Raisins	Pound	.10
Rice	....do	.05½
Sage	....do	.18
Sago	....do	.08
Salmon	Dozen	1.30
Salt:		
Table	Pound	.01
Coarse	....do	.00½
Sapolio	Box	4.40
Sauce:		
Pepper	Bottle	.12
Worcestershire	Pint	.40
Do	Gallon	.95
Shoulders	Pound	.09
Soap:		
Ivory	Box	4.00
Grandpa's Wonder	....do	3.85
Octagon	....do	3.75
Olive	....do	2.10
Soda:		
Cooking	Pound	.07
Washing	....do	.01½
Spaghetti	....do	.05
Starch:		
Corn	....do	.04½
Laundry	....do	.03½
Sugar:		
Standard granulated	....do	.05
Yellow clarified	....do	.04½
Open kettle	....do	.04
Powdered	....do	.06
Tapioca	....do	.07½
Tea	....do	.35
Thyme	....do	.25
Tomatoes	Dozen	1.00
Vermicelli	Pound	.07
Vinegar	Gallon	.25
Yeast, Fleishman's compressed	Pound	.50
Yeast cake	Box	.60
Pearline	Case	3.75

Date of contract: September 3, 1907.
Date of approval: Emergency contract.
Date of commencement: September 3, 1907.
Date of expiration: March 30, 1908.

XIV.

Name and address of contractor: Bowers' Southern Dredging Company, Galveston, Tex.
Work: Dredging a channel in Southwest Pass, Mississippi River.
Contract price: 14 cents per cubic yard; total, $475,440.
Date of contract: September 26, 1907.
Date of approval: October 21, 1907.
Date of commencement: November 13, 1907.
Date of expiration: May 20, 1908.

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XV.

Name and address of contractor: Stern Foundry and Machinery Company, New Orleans, La.

Work: Furnishing bolts, washers, etc., for the work at Southwest Pass, Mississippi River.

Contract prices.

Article.	Unit price.
Drift bolts, standard, threaded, 3 inches, square head and nuts:	
2,350, ¾ inch diameter by 18 inches long	$4.09 per 100.
60, ¾ inch diameter by 18 inches long	$8.11 per 100.
700, ¾ inch diameter by 24 inches long	$8.91 per 100.
Bolts, standard, threaded, 3 inches, square heads and nuts:	
55, ¾ inch diameter by 36 inches long	$20.65 per 100.
30, ¾ inch diameter by 25 inches long	$15.02 per 100.
20, ¾ inch diameter by 13 inches long	$9.08 per 100.
220, ¾ inch diameter by 24 inches long	$15.46 per 100.
3, ¾ inch diameter by 23 inches long	$13.80 per 100.
6, ¾ inch diameter by 21 inches long	$13 per 100.
66, ¾ inch diameter by 20 inches long	$12.47 per 100.
3, ¾ inch diameter by 23 inches long	$10 per 100.
6, ¾ inch diameter by 21 inches long	$9.41 per 100.
424, ¾ inch diameter by 19 inches long	$8.42 per 100.
640, ¾ inch diameter by 17 inches long	$7.73 per 100.
200, ¾ inch diameter by 13 inches long	$6.38 per 100.
Cast-iron washers:	
750, for ¾-inch bolts, about 1,030 pounds	2½ cents per lb.
2,380, for ¾-inch bolts, about 2,800 pounds	2¼ cents per lb.
100, for 1-inch bolts, about 160 pounds	2½ cents per lb.
400 pounds wrought-iron spikes, ¾ inch by 10 inches long	$3.35 per 100.
300 pounds railroad spikes, ⅞ inch by 4 inches long	$2.75 per 100.
8 kegs wire spikes, 7 inches long	$5.70 each.
2 kegs wire nails, 6 inches long	$5.90 each.
18 kegs wire nails, 6½ inches long	$5.90 each.
7 kegs wire nails, 5 inches long	$6.10 each.
4 kegs wire nails, 4 inches long	$6.10 each.
6 kegs wire nails, 3 inches long	$6.40 each.
50 stirrups, 1-inch round iron, threaded 4 inches each end, two square nuts	$0.75 each.
Steel T rails, 30 pounds to the yard, with splice bars, tract bolts, and nuts, two frogs and fixed switch joints, rails bent to radius shown; sufficient to lay track as shown on accompanying sketch, approximately 825 feet of rail for	$300.

Date of contract: December 11, 1907.
Date of approval: Emergency contract.
Date of commencement: December 11, 1907.
Date of expiration: February 25, 1908.

XVI.

Name and address of contractor: Salmen Brick and Lumber Company (Limited), New Orleans, La.

Work: Furnishing and delivering creosoted lumber and piles for the work at Southwest Pass, Mississippi River.

Contract price: For 50-foot piles, $19.95 each: 30-foot piles, $11.95 each; 25-foot piles, $9.95 each. For lumber, $52.50 per 1,000 feet B. M.

Date of contract: December 10, 1907.
Date of approval: December 19, 1907.
Date of commencement: December 10, 1907.
Date of expiration: February 23, 1908.

XVII.

Name and address of contractor: Joseph Edwards & Co., New York City.

Work: Furnishing cast-steel elbows and sleeves for the dredge *Benyaurd*.

Contract price: For elbows, $192.50; for sleeves, $178.50 each.

Date of contract: January 13, 1908.
Date of approval: Emergency contract.
Date of commencement: January 13, 1908.
Date of expiration: January 12, 1909.

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XVIII.

Name and address of contractor: Ellicott Machine Company, Baltimore, Md.
Work: Furnishing ball and socket joints for dredge *Benyaurd* for period of six months.
Contract price: $343 each.
Date of contract: January 8, 1908.
Date of approval: Emergency contract.
Date of commencement: January 8, 1908.
Date of expiration: July 3, 1908.

XIX.

Name and address of contractor: Swift & Co. (Limited), New Orleans, La.
Work: Furnishing and delivering fresh meat for use of dredges, etc., for a period of five months from date of contract.

Contract prices.

Articles.	Estimated quantity.	Unit price.
Beef:		
Fresh western, hind quarters	10,000 pounds	$9.00
Fresh western, fore quarters	4,000 pounds	6.00
Fresh western, sides	500 pounds	7.00
Mutton, fresh, whole carcasses	1,000 pounds	10.00
Veal, whole carcasses	1,500 pounds	8.00
Pork shoulders, fresh (boxes)	1,250 pounds	10.00
Pork loins, fresh (boxes)	1,000 pounds	12.00
Sausage:		
Bologna (25s)	500 pounds	6.50
Pork link (5s and 15s)	800 pounds	8.00
Wienerwurst (10s)	100 pounds	8.00
Tripe, pickled (15s)	20 kits	a.75
Spare ribs, half-barrels (100s)	6 half-barrels	a9.00

a Each.

Date of contract: January 9, 1908.
Date of approval: Emergency contract.
Date of commencement: January 9, 1908.
Date of expiration: June 9, 1908.

XX.

Name and address of contractor: The Bucyrus Company, South Milwaukee, Wis.
Work: Furnishing and delivering cast-iron pump runners, etc., for the U. S. dredge *Benyaurd*.
Contract price: $2,594.
Date of contract: February 26, 1908.
Date of approval: Emergency contract.
Date of commencement: March 5, 1908.
Date of expiration: April 19, 1908.

XXI.

Name and address of contractor: James G. Swarbrick, New Orleans, La.
Work: Furnishing and delivering subsistence supplies for the dredges, etc., for the period from March 25, 1908, to September 30, 1908.

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Contract prices.

Articles.	Unit of quantity.	Unit price.
Allspice	Pound	$0.25
Apples:		
Evaporated	do	.07½
Canned	Dozen	.90
Bacon, breakfast	Pound	.14
Barley	do	.06½
Beans:		
Red kidney	do	.06½
White navy	do	.06½
Canned string	Dozen	.85
Beef:		
Corned	Half barrel	7.50
Corned, 14s	Dozen	17.25
Blackberries	do	.85
Bluing	Gross	1.20
Bread	Pound	.06
Butter:		
Creamery	do	.26
Dairy	do	.20
Cabbage	do	.02½
Catsup	Gallon	1.05
Charcoal	Sack	.40
Cheese	Pound	.15½
Chowchow	Gallon	.65
Cinnamon	Pound	.15
Cloves	do	.20
Codfish	do	.04½
Coffee	do	.15
Coke	Sack	.30
Corn, canned	Dozen	.80
Crackers	Pound	.06
Cream, canned	Dozen	.85
Currants	Pound	.10
Curry powders	do	.20
Eggs	Dozen	.16
Extract:		
Vanilla (4-ounce)	Bottle	.20
Lemon (4-ounce)	do	.15
Flour:		
Wheat	Barrel	4.75
Graham	Pound	.04
Garlic	do	.09
Gelatin	Package	.10
Ginger	Pound	.20
Grits	do	.01½
Ham	do	.13
Hominy	do	.02½
Jelly	do	.05½
Lard	do	.09
Stearine	do	.18
Lemons	Box	4.00
Lye	Dozen	.50
Macaroni	Pound	.05
Mackerel	do	.10
Matches	Gross	.60
Meal	Pound	.01½
Milk, condensed	Dozen	1.20
Molasses	Gallon	.40
Mustard	Pound	.30
Nutmegs	Ounce	.02½
Oatmeal, 2s	Dozen	1.10
Oil, olive	Quart	.40
Onions	Pound	.02½
Paper, toilet	Roll	.3½
Peaches, evaporated	Pound	.12½
Peaches, 3s	Dozen	1.75
Pears	do	1.75
Peas, 2s	do	.95
Green	Pound	.04
Split	do	.04
Pepper:		
Black	do	.20
Chili	do	.20
Cayenne	do	.40
Pickles	Gallon	.45
Piefruit	Dozen	.95
Pig's feet	Half-barrel	3.15
Potatoes:		
Irish	Bushel	1.10
Sweet, yams	Pound	.03
Powder, baking	do	.40
Prunes	do	.08

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Contract prices—Continued.

Articles.	Unit of quantity.	Unit price.
Raisins	Pound	$0.09
Rice	do	.05½
Sage	do	.10
Sago	do	.08
Salmon	Dozen cans	1.30
Salt:		
Fine	Pound	.01
Coarse	do	.00½
Sapolio	Case	4.40
Sauce	Bottle	.10
Shoulders	Pound	.08
Soap:		
Ivory	Box	4.00
Octagon	do	3.90
Olive	do	2.25
Soda:		
Cooking	Pound	.10
Washing	do	.01
Starch:		
Laundry	do	.04
Corn	do	.09
Sugar:		
Standard granulated	do	.05
Yellow clarified	do	.04½
Open kettle	do	.04
Powdered	do	.06
Tapioca	do	.08
Tea	do	.35
Tomatoes	Dozen	1.10
Vermicelli	Pound	.07
Vinegar	Gallon	.25
Yeast:		
Fresh	Pound	.50
Cakes	Package	.60
Pearline	Case	3.75
Powder, washing	Dozen	2.50

A deduction of 1 per cent from the unit prices quoted for deliveries f. o. b., city limits, New Orleans, La.

Date of contract: March 25, 1908.

Date of approval: Emergency contract.

Date of commencement: March 25, 1908.

Date of expiration: September 30, 1908.

XXII.

Name and address of contractor: J. C. Jung Company, New Orleans, La.

Work: Furnishing and delivering coal for use of the dredges for a period of one year from date of notification of approval of contract.

Contract price:

Delivered in coal yard at Port Eads and Burrwood, La., 40.85 cents per barrel.

Delivered in bunkers of dredges at New Orleans, La., 36.85 cents per barrel.

Delivered on Government barges, 44.80 cents per barrel.

Delivered in barges belonging to contractors at Port Eads or Burrwood, La., 47.85 cents per barrel.

Date of contract: March 19, 1908.

Date of approval: March 30, 1908.

Date of commencement: April 2, 1908.

Date of expiration: April 1, 1909.

XXIII.

Name and address of contractor: Bowers' Southern Dredging Company, Galveston, Tex.

Supplemental work: Modifying original contract dated September 26, 1907, for dredging a channel in Southwest Pass, Mississippi River.

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Contract price: 614,527 cubic yards, at 13 cents per cubic yard, and 19,42[illegible] cubic yards, at 6½ cents per cubic yard.
Date of contract: April 3, 1908.
Date of approval: April 15, 1908.
Date of commencement: April 15, 1908.
Date of expiration: One hundred days from date when the stage of water on the Carrollton gauge becomes 9 feet on a declining river.

XXIV.

Name and address of contractor: Haubtman & Loeb (Limited), New Orleans, La.
Work: Furnishing two duplex vertical engines for the dredge *Benyaurd*.
Contract price: $678 for both engines.
Date of contract: April 15, 1908.
Date of approval: Emergency contract.
Date of commencement: April 15, 1908.
Date of expiration: May 25, 1908.

XXV.

Name and address of contractor: The Jahncke Navigation Company, New Orleans, La.
Work: Furnishing dredge, crew, and equipment for use in connection with removal of sill across Southwest Pass, Mississippi River.
Contract price: $213 per day.
Date of contract: May 4, 1908.
Date of approval: May 15, 1908.
Date of commencement: July 17, 1908.
Date of expiration: September 16, 1908.

XXVI.

Name and address of contractor: Penn Bridge Company, Beaver Falls, Pa.
Work: Constructing one steel frame building at Southwest Pass, Mississippi River.
Contract price: $12,400.
Date of contract: May 8, 1908.
Date of approval: May 14, 1908.
Date of commencement: July 17, 1908.
Date of expiration: November 4, 1908.

XXVII.

Name and address of contractor: Swift & Co. (Limited), New Orleans, La.
Work: Furnishing fresh meat for dredges, etc., for a period of six months.

Contract prices.

Article.	Estimated quantities.	Unit price.
Beef:		
Fresh western, hind quarters	10,000 pounds	$8.75
Fresh western, fore quarters	4,000 pounds	5.50
Fresh western, sides	500 pounds	6.25
Mutton, whole carcasses	1,000 pounds	10.00
Veal, whole carcasses	1,500 pounds	8.00
Pork shoulders, fresh (boxes)	1,250 pounds	10.00
Pork loins, fresh (boxes)	1,000 pounds	12.00
Sausage:		
Bologna (25s)	500 pounds	6.50
Pork link (5s and 15s)	300 pounds	8.00
Wienerwurst (10s)	100 pounds	8.00
Tripe, pickled (15s)	20 kits	e.75
Spare ribs, half barrels (100s)	6 half barrels	9.00

* Each.

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Date of contract: June 10, 1908.
Date of approval: Emergency contract.
Date of commencement: June 10, 1908.
Date of expiration: December 10, 1908.

XXVIII.

Name and address of contractor: Stern Foundry and Machinery Company, New Orleans, La.
Work: Furnishing suction pipes for the dredge *General Abbot* for a period of one year from June 27, 1908.
Contract price: $220 per pipe.
Date of contract: June 27, 1908.
Date of approval: Emergency contract.
Date of commencement: June 27, 1908.
Date of expiration: June 27, 1909.

S 3.

EXAMINATIONS AND SURVEYS AT SOUTH PASS, MISSISSIPPI RIVER.

In accordance with provisions of the river and harbor act approved June 13, 1902, surveys of the shoaler reaches in South Pass and of the jetty channel were made with sufficient frequency, generally weekly and monthly, to determine what changes were taking place and to determine at what locality dredging was most necessary.

Charts Nos. 1, 2, 3, and 4, which accompany this report, show the channel from deeper water in the main river to deeper water in the Gulf of Mexico, a distance of about 14½ miles.

Under circumstances and conditions as they existed, this channel was maintained with the utmost efficiency during the year.

During the last fiscal year detailed annual survey was made from deep water in the Mississippi River through South Pass to deep water in the Gulf of Mexico, and of Pass a Loutre crevasse. The results are shown on the four charts accompanying this report.

Frequent examinations and surveys were made during the past fiscal year of the shoaler reaches in South Pass and beyond the ends of the jetties to determine the condition of the channel.

Detailed annual surveys were made from deep water in the Mississippi River through South Pass to deep water in the Gulf of Mexico. The results are shown on the charts which accompany this report. Examinations and surveys of the shoaler localities in South Pass were made with sufficient frequency during the past fiscal year to determine the condition of and the changes in the channel.

A survey of the three miles of river between Cubits Gap light and the head of South Pass was made in March, 1908, on account of a large body of sand which interfered with navigation. Ranges were established for the placing of mattress sills in Pass a Loutre and across Cubits Gap and The Jump.

Money statement.

APPROPRIATION FOR FISCAL YEAR 1907.

July 1, 1907, balance unexpended	$1,500.00
June 30, 1908, amount expended during fiscal year	1,500.00

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APPROPRIATION FOR FISCAL YEAR 1908.

July 1, 1907, amount appropriated by river and harbor act of June 13, 1902, for fiscal year 1908	$10,00
June 30, 1908, amount expended during fiscal year	8,95
July 1, 1908, balance unexpended	1,05
July 1, 1908, outstanding liabilities	1,05
July 1, 1908, total cost of operations during fiscal year	10,00

S 4.

MAINTENANCE AND IMPROVEMENT OF SOUTH PASS CHANNEL, MISSISSIPPI RIVER.

For references as to progress of the work see Annual Report of Chief of Engineers for 1904, page 1886. See also report for 1 pages 1413–1417.

For convenience of reference the operations for the past fiscal are given under subheadings.

MAINTENANCE OF JETTIES AND AUXILIARY WORKS.

At the head of South Pass and in the pass itself.—The struct which have been maintained at these localities for many years co of west dike and upper dam at the head of the pass, three wing d in the pass itself in Goat Island reach, and seven in Grand Ba reach. These are more or less of a tentative character, and are m tained from year to year at a comparatively small expense in an cient condition by the addition of piling, willows, and stone.

At the mouth of South Pass.—The works at this locality, w alone require attention and are important factors in the mainten of the channel through the jetties, consist of the inner east jetty 38 wing dams. These were maintained as usual during the year.

The materials used during the year in maintaining the works t tioned above were as follows: Two hundred and sixty-two piles waling timbers; 58 barrels cement; 7,553.9 cords of willows, and 3 cubic yards of stone.

The total amount expended during the year in connection w maintenance of the jetties and auxiliary works proper was $132,23 This includes outstanding liabilities, June 30, 1907, amountin $9,763.74.

The following extract from the report of Mr. Cornelius Dono assistant engineer, gives in concrete form a résumé of the operat during the past fiscal year:

Maintenance of jetties and auxiliary works.—Minor necessary repairs made to dikes and dams which have been maintained for many years a head of South Pass, in the Pass itself, and in the jetty channel at the m of the Pass. They have been kept in an efficient condition, and wil strengthened still more when the river returns to a low stage, at which conditions are most favorable for doing the work.

The plant.—Wharves, floating plant, and buildings were repaired and in good condition.

Dredging.—Dredging was done on 152 days during the year, which is one the number of working days in the year. The dredge *Benjamin* worked seven days and the *General Abbot* ninety-five days. Twenty-nine days' dr ing was done in South Pass, and one hundred and twenty-three days in the c nel beyond the ends of the jetties.

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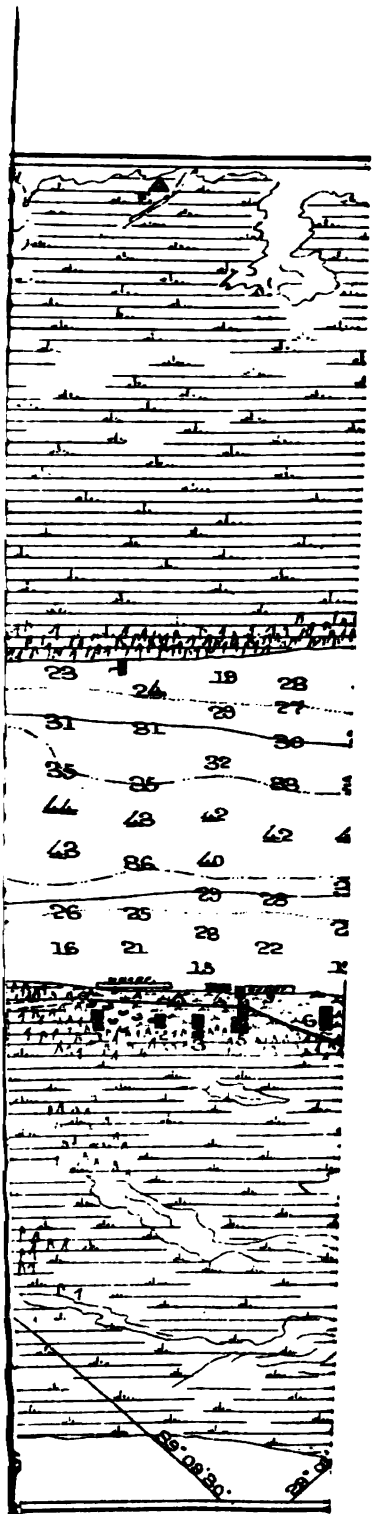

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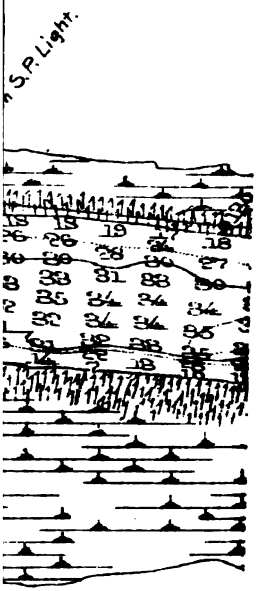

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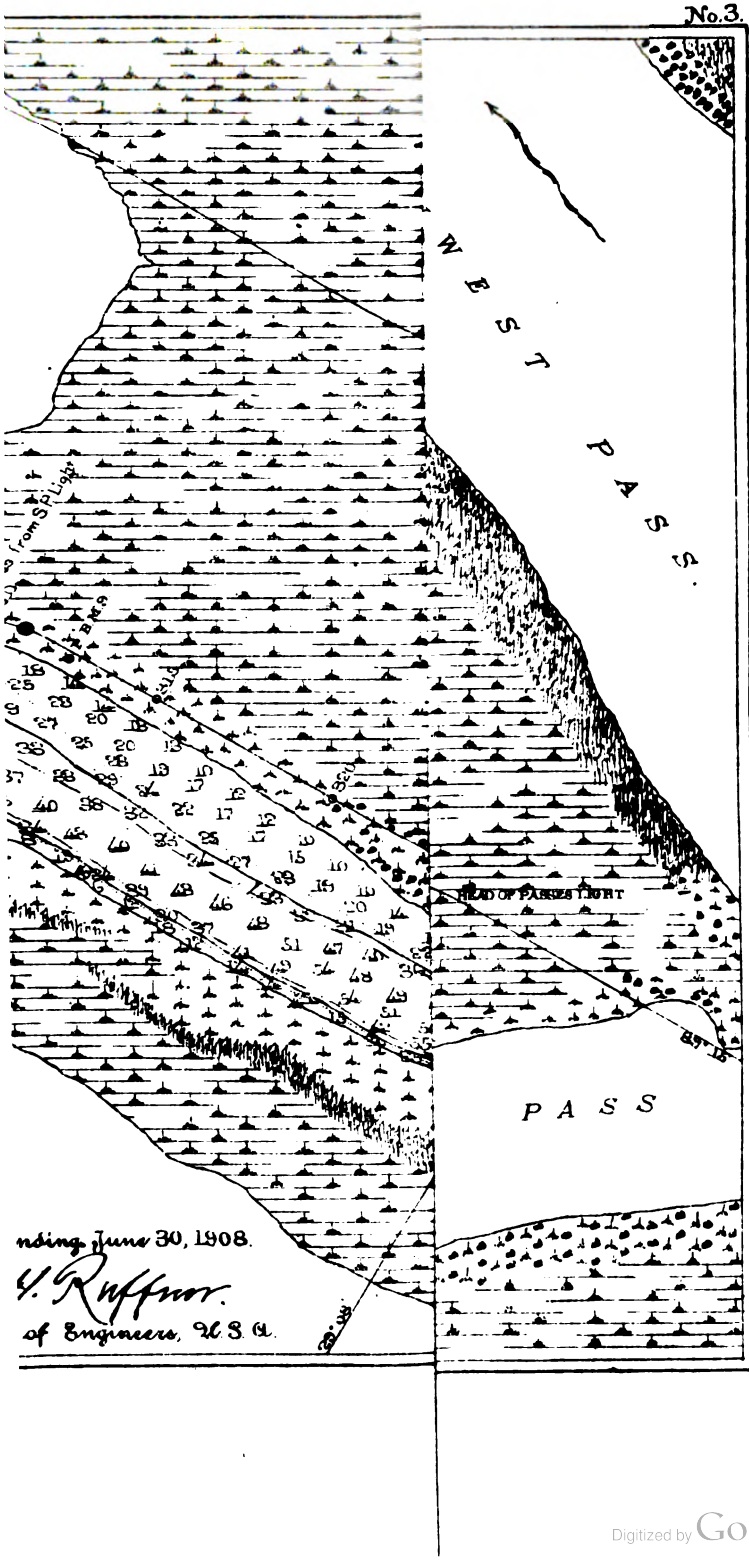

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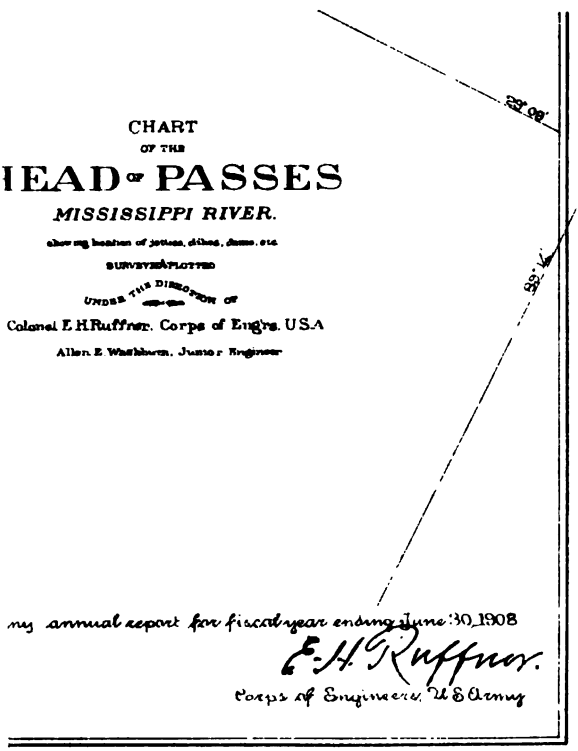

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As the above record would indicate, the channel through South Pass remained in excellent condition during the year. During the months of March and May the movement of sand through certain reaches caused temporary shoals, but navigation was not much inconvenienced.

An active mud lump in mid-channel beyond the ends of the jetties, shown on chart No. 1, was the cause for most of the dredging in that locality.

Navigation of the channel.—One hundred and fifty-six vessels drawing more than 25 feet, the deepest one drawing 28½ feet, passed through the channel during the year. Fourteen vessels, mostly of light draft, met with mishaps in navigating the channel, but in only one instance were they attributable to insufficient depth of water, and in that case the shoal was a temporary one caused by the movement of sand along the bottom.

In the other cases strong current, insufficient power, fog, defective steering gear, "would not answer her helm," etc., were the causes given.

Materials and labor.—Materials and labor expended during the year in the prosecution of the work were as follows: Three thousand seven hundred and five days of eight hours, 7,553 cords of willows, 3,951 cubic yards of stone, 262 piles, 67 waling timbers, and 58 barrels cement. The total amount expended for the above was $40,868.40, and for dredging $91,366.62. The latter amount includes necessary repairs during the year.

This report is accompanied by four charts, which show the channel for 14 miles from the main river, through South Pass, to the Gulf of Mexico.

Money statement.

APPROPRIATION FOR FISCAL YEAR 1907.

July 1, 1907, balance unexpended	[a] $9,748.76
June 30, 1908, amount expended during fiscal year	9,748.76

APPROPRIATION FOR FISCAL YEAR 1908.

July 1, 1907, amount appropriated by emergency river and harbor act of June 6, 1900	$100,000.00
Miscellaneous receipts during fiscal year deposited to credit of the appropriation	2,292.69
Amount received from refundment of overpayment during fiscal year	40.63
	102,333.32
June 30, 1908, amount expended during fiscal year	88,144.14
July 1, 1908, balance unexpended	14,189.18
July 1, 1908, outstanding liabilities	14,189.18

APPROPRIATION FOR MAINTENANCE OF SOUTH PASS CHANNEL, MISSISSIPPI RIVER.

July 1, 1907, balance unexpended	$50,129.31
June 30, 1908, amount expended during fiscal year	34,327.14
July 1, 1908, balance unexpended	15,802.17
July 1, 1908, outstanding liabilities	13,509.80
July 1, 1908, balance available	2,292.37
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908, for maintenance of improvement, in addition to regular annual appropriation of $100,000. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	50,000.00

[a] The amount stated as unexpended in the annual report for fiscal year ending June 30, 1907, was $9,748.76. To this should be added the sum of $14.98 collected from the Signal Corps for work done by the Engineer Corps in testing cables at South Pass, which was expended during the fiscal year ending June 30, 1908.

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MAINTENANCE OF SOUTH PASS CHANNEL, MISSISSIPPI RIVER, 1909.

Amount appropriated by sundry civil act of May 27, 1908	$50,000.00
July 1, 1908, balance available	50,000.00

APPROPRIATIONS.

MAINTENANCE.

June 6, 1900 (indefinite), $100,000 annually	$800,000.00
June 6, 1900 (allotted)	10,000.00
June 13, 1902	75,000.00
June 30, 1906	50,000.00
March 2, 1907	50,000.00
May 27, 1908	50,000.00
	1,035,000.00
Transferred from appropriations for improving Passes of the Mississippi River	100.25
Transferred from appropriation for improving Southwest Pass, Mississippi River	23,305.33
Miscellaneous receipts deposited to the credit of the appropriation	4,010.15
Transferred by Treasury Department from appropriation for repairs and incidental expenses of light-houses, 1907, on account of services rendered by Engineer Corps in driving piles for Light-House Department	8.14
Deposited to credit of appropriation by chief signal officer, Atlanta, Ga., on account expenses incurred by Engineer Corps in testing cable	6.84
Amount received as refundment of overpayments during fiscal year 1908	40.63
	1,062,471.34
Reverted to Treasury	73,532.48

ABSTRACT OF CONTRACTS IN FORCE DURING FISCAL YEAR ENDING JUNE 30, 1908.

I.

Name and address of contractor: Ellicott Machine Company, Baltimore, Md.
Work: Furnishing suction heads for U. S. dredge *General Abbot*.
Contract price: $574 for first suction head and $436 for additional ones.
Date of contract: January 21, 1907.
Date of approval: Emergency contract.
Date of commencement: January 21, 1907.
Date of expiration: January 21, 1908.

II.

Name and address of contractor: Houlton Lumber Company, New Orleans, La.
Work: Furnishing and delivering piles and waling timbers for the work at Port Eads, La.

Contract price.

Yellow-pine piles:	
300, 30 feet long, at	$2.875
100, 40 feet long, at	3.75
100, 50 feet long, at	4.625
50, 60 feet long, at	5.50
Yellow-pine waling timbers, 50, 60 feet long, at	9.50

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Date of contract: June 3, 1907.
Date of approval: Emergency contract.
Date of commencement: June 3, 1907.
Date of expiration: August 2, 1908.

III.

Name and address of contractor: Richard M. Murphy, New Orleans, La.
Work: Furnishing willows for the work at South Pass, Mississippi River.
Contract price: $1.14 per cord.
Date of contract: July 5, 1907.
Date of approval: July 20, 1907.
Date of commencement: July 24, 1907.
Date of expiration: June 30, 1908.

IV.

Name and address of contractor: James Shewan & Sons, New York City.
Work: Repairs to the U. S. dredge *General Abbot*.
Contract price: As stated in contract, $23,008.05. Amount paid, under decision of the Comptroller of the Treasury, $17,199.93 additional for extra work, making a total of $40,207.98.
Date of contract: July 26, 1907.
Date of approval: August 2, 1907.
Date of commencement: July 27, 1907.
Date of expiration: October 4, 1907.

V.

Name and address of contractor: James Shewan & Sons, New York City.
Work: Additional repairs to U. S. dredge *General Abbot*.
Contract price: $5,449.50.
Date of contract: August 20, 1907.
Date of approval: August 28, 1907.
Date of commencement: August 28, 1907.
Date of expiration: November 14, 1907.

VI.

Name and address of contractor: The Bucyrus Company, South Milwaukee, Wis.
Work: Furnishing ball and socket joints for the dredge *General Abbot*.
Contract price: $320 for first joint and $305 for subsequent joints.
Date of contract: January 16, 1908.
Date of approval: Emergency contract.
Date of commencement: January 16, 1908.
Date of expiration: July 3, 1908.

VII.

Name and address of contractor: Ellicott Machine Company, Baltimore, Md.
Work: Furnishing suction heads for dredge *General Abbot*.
Contract price: $379 each.
Date of contract: February 14, 1908.
Date of approval: Emergency contract.
Date of commencement: February 14, 1908.
Date of expiration: February 13, 1909.

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COMMERCIAL STATISTICS, FROM JANUARY 1, 1907, TO DECEMBER 31, 1907.

PORT OF NEW ORLEANS, LA.

Number and tonnage of vessels entered and cleared at New Orleans, La.

Class.	Entered.		Cleared.	
	Number.	Tonnage.	Number.	Tonnage.
FOREIGN-BOUND VESSELS.				
Steamers	1,061	1,942,748	1,065	2,108,4[illegible]
Sailing vessels	81	24,608	26	27,[illegible]
COASTWISE VESSELS.				
Steamers	282	779,516	267	634,[illegible]
Sailing vessels	3	2,933	4	5,[illegible]
Total	1,377	2,749,805	1,382	2,775,8[illegible]

From information furnished by the collector of the port of New Orleans, La.

FOREIGN EXPORTS AND IMPORTS.

Exports.

Article.	Year ending December 31, 1907.		Article.	Year ending December 31, 1907.	
	Tons.	Value.		Tons.	Value.
Agricultural implements	5,125	$245,991	Mineral oils	7,278	$333,1[illegible]
Cattle	2,056	117,336	Cotton-seed oil	44,100	4,504,[illegible]
Horses	2,078	227,987	Paraffin and paraffin wax	5,752	569,[illegible]
Mules	1,148	186,649	Canned beef	856	165,[illegible]
All other animals	1,069	85,523	Beef, salted or pickled	978	141,7[illegible]
Corn	192,766	3,626,680	Tallow	9,461	921,[illegible]
Oats	6,229	233,575	Bacon and hams	657	185,[illegible]
Wheat	152,691	5,120,838	Pork, salted or pickled	2,755	472,[illegible]
Flour	46,615	2,055,313	Lard and lard compound	25,326	4,765,777
All other breadstuffs	1,082	156,916	Other meat products	1,496	254,3[illegible]
Cars, carriages, vehicles, and parts of	2,491	249,169	Dairy products	1,071	321,3[illegible]
Chemicals, drugs, dyes, and medicines	5,356	374,937	Rice, rice bran, meal, and polish	12,442	252,1[illegible]
Cotton	513,104	111,835,593	Salt	16,328	96,9[illegible]
Manufactures of cotton	508	488,354	Seeds	524	157,0[illegible]
Eggs	987	245,400	Soap	6,078	367,4[illegible]
Grease and soap stock	2,377	237,714	Malt liquors	1,194	238,7[illegible]
Machinery, machines, and parts of	10,484	524,201	Molasses and sirup	11,105	192,5[illegible]
Pipes and fittings	2,187	349,017	Tobacco	16,338	3,482,3[illegible]
All other manufactures of iron and steel	14,399	719,958	Beans, peas, onions, and potatoes	4,934	224,3[illegible]
Boots and shoes	324	382,603	Logs, boards, deals, planks, staves, etc	682,416	10,837,374
Musical instruments	10	17,928	Furniture and other manufactures of wood	98,681	986,815
Rosin	5,324	150,414	Miscellaneous	14,168	2,125,171
Turpentine	1,026	148,079	Coal	8,052	27,986
Cotton-seed cake and meal	213,634	5,054,073			
Linseed cake and meal	5,887	151,838	Total exports	2,160,941	164,611,339

Imports.

Coffee	121,354	$16,349,320	Matting	1,979	$227,260
Bananas and plantains	314,900	3,435,452	Tobacco and cigars	79	177,775
Sisal grass	10,774	1,627,892	Wood, and manufactures of	7,381	73,818
Oils	28,462	662,023	Toys of all kinds	964	337,354
Cement	6,202	35,773	Fertilizers	16,985	151,684
Sugar	160,397	7,134,246	Earthen, stone, and china ware	4,081	408,051
Molasses	26,103	108,680	India rubber	167	213,802
Salt	6,775	42,111	Cotton, manufactures of	630	598,586
Rice	3,502	164,030	Mahogany logs	22,714	612,868
Sardines and all fish	627	156,745	Miscellaneous	12,943	1,941,500
Vegetables	1,443	216,418			
Fruits and nuts	38,734	464,811	Total imports	860,549	44,1[illegible]8,490
Fibers, manufactures of	17,386	5,216,053	Total exports	2,160,941	164,611,339
Chemicals	28,707	2,009,491			
Wines, liquors, etc	1,361	527,789	Total exports and imports	3,021,490	208,799,838
Iron and steel, manufactures of	25,899	1,294,936			

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Domestic shipments and receipts.

Articles.	Year ending December 31, 1907.		Articles.	Year ending December 31, 1907.	
	Tons.	Value.		Tons.	Value.
SHIPMENTS.			RECEIPTS.		
Oil	16,098	$177,023	Oil	1,828	$20,108
Cotton	34,989	7,487,646	Iron and steel	22,031	1,101,550
Cotton seed	115	2,300	Mineral products	1,461	29,220
Lumber	57,643	576,430	Sugar	804	48,240
Mineral products	68,903	1,378,060	Cotton	1,031	220,644
Sugar	42,794	2,567,640	Salt	110	385
Rice	10,045	552,475	Lumber	444	4,440
Salt	5,484	19,194	Asphalt	205	412
Wines	2,005	140,350	Wines	445	30,150
Miscellaneous	37,646	5,646,900	Miscellaneous	201,530	30,229,500
Total shipments	275,717	18,548,018	Total receipts	229,890	31,684,639
			Total shipments	275,717	18,548,018
			Total shipments and receipts	505,607	50,232,657

S 5.

IMPROVEMENT OF BAYOU LAFOURCHE, LOUISIANA.

No work was done during the past fiscal year, as a dam has been constructed across the head of the bayou by State levee boards, under authority of act of Congress approved June 13, 1902. No estimate for additional funds for this improvement is submitted, as the time for the removal of the dam has been extended to January 10, 1910, by joint resolution of Congress approved March 2, 1907.

The amount expended during the fiscal year ending June 30, 1908, was $5.50.

In answer to complaints from the navigation interests, an examination was made, during July, 1907, of an old sunken barge in the navigable channel near Lockport, La. It was found that the barge was an obstruction to navigation, and also that other obstructions had been placed in the channel by private parties. They were ordered removed.

Money statement.

July 1, 1907, balance unexpended	$1,920.33
June 30, 1908, amount expended during fiscal year	5.50
July 1, 1908, balance available	$1,914.83

APPROPRIATIONS.

June 13, 1878	$10,000	August 18, 1894	$10,000
March 3, 1879	10,000	June 3, 1896	25,000
June 14, 1880	5,000	March 3, 1899 (maintenance)	7,500
July 5, 1884	5,000	June 13, 1902 (maintenance)	7,500
August 11, 1888	50,000		
September 19, 1890	50,000	Total	280,000
July 13, 1892	50,000		

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COMMERCIAL STATISTICS.

Articles.	Year ending December 31, 1907.	
	Tons.	Value.
SHIPMENTS.		
Rice	245	$9,632
Vegetables	8,715	270,165
Sugar and molasses	2,163	129,780
Moss	99	3,960
Miscellaneous	384	47,600
Total shipments	11,606	460,937
RECEIPTS.		
Fuel oil	31,272	250,176
Miscellaneous	4,535	680,250
Total receipts	35,807	930,426
Total shipments and receipts	46,413	1,391,363

S 6.

IMPROVEMENT OF BAYOU TECHE, LOUISIANA.

For references as to the progress of the work, see page 1901 of the Annual Report of the Chief of Engineers for 1904.

Bayou Teche is an important Commercial stream of southern Louisiana, and is the waterway for shipping for the numerous sugar and lumber mills located along its banks. With the exception of snags, the channel is in a fairly good condition below New Iberia, but of late years it has shoaled considerably between New Iberia and St. Martinville, and is not navigable above the latter point. The improvement of channel accomplished will not be a permanent one, as sunken logs, fallen trees, and shoals are constantly forming obstructions which will require removal.

The site for the lock near St. Martinville and the site for the dam across the head of Bayou Fusilier have been located, and the land required near the proposed lock has been surveyed. A deed of all the land required for lock and canal feeders has been tendered, and an abstract of title was forwarded to the Department April 27, 1908, for an opinion by the Attorney-General as to the validity of title.

A contract was entered into January 6, 1908, with C. M. Guess, jr., New Iberia, La., for dredging through the bars in Bayou Teche below New Iberia, La. The work was begun January 11, 1908, and completed February 21, 1908. The total distance dredged was 10,895 feet, to an average depth of 6 feet and a width of 30 feet at mean low tide. Approximately 34,425 cubic yards of material were removed. The total amount earned by the contractor was $2,700.

An allotment of $500 was made from this appropriation January 10, 1908, for expenditure in connection with the removal of logs from the navigable channel of Bayou Teche, Louisiana.

The proposed work was advertised October 5, 1907, bids to be opened November 6, 1907, but none were received. Two informal offers were subsequently received, one for $1.50 and one for $5 per

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log. The former was accepted and emergency contract prepared and sent for signature January 18, 1908, but the bidder failed to execute and return it. In view of the fact that the bid was informal and that no guaranty was furnished or required, no attempt was made to hold the bidder to his proposal. Efforts were made to secure an advantageous bid for doing the work, but without success. The work is not of a very urgent character, and probably can best be done when the dam construction on this bayou, provided for by the river and harbor act of March 2, 1907, is begun.

Money statement.

July 1, 1907, balance unexpended	$133,127.08
Amount allotted from emergency appropriation act of March 2, 1907	500.00
	133,627.08
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,116.36
July 1, 1908, balance unexpended	130,510.72
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	20,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATIONS.

July 11, 1870	$17,500	June 13, 1902 (maintenance)	$7,500
June 14, 1880	6,000	March 3, 1905 (maintenance)	7,500
March 3, 1881	20,000	March 2, 1907 (lock and dam and maintenance)	130,000
July 5, 1884	6,500		
September 19, 1880	5,000	March 2, 1907 (allotted January 11, 1908)	500
August 18, 1894	6,000		
June 3, 1896	10,000		
March 3, 1899	10,000	Total	226,500

ABSTRACT OF CONTRACTS IN FORCE DURING FISCAL YEAR ENDING JUNE 30, 1908.

I.

Name and address of contractor: C. M. Guess, jr., New Iberia, La.
Work: Furnishing and operating a dredge for dredging a channel in Bayou Teche, Louisiana.
Contract price: $75 per day.
Date of contract: January 6, 1908.
Date of approval: Emergency contract.
Date of commencement: January 11, 1908.
Date of expiration: February 24, 1908.

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COMMERCIAL STATISTICS.

Articles.	Year ending December 31, 1907.	
	Tons.	Value.
SHIPMENTS.		
Sugar	54,022	$4,321,760
Molasses	9,338	317,492
Cotton and cotton-seed products	3,462	138,480
Rice	2,412	92,862
Bricks	15,080	48,256
Lumber	10,870	155,550
Machinery	5,000	500,000
Cane	75,260	256,884
Miscellaneous	21,850	3,277,500
Total shipments	196,794	9,107,984
RECEIPTS.		
Machinery	1,748	174,800
Fertilizers	2,560	51,200
Cooperage	7,492	123,618
Coal	8,061	33,860
Fuel oil	97,859	782,872
Cane	35,000	119,000
Logs and lumber	215,964	2,159,640
Miscellaneous	14,788	2,210,700
Total receipts	383,422	5,655,690
Total shipments and receipts	580,216	14,763,674

S 7.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

An allotment of $43.44 was made from this appropriation November 12, 1907, to be applied to payment of expenses incurred in printing specifications and advertising for proposals for removal of logs obstructing the navigable channel of Bayou Teche, Louisiana.

An allotment of $45.36 was made from this appropriation January 27, 1908, to be applied to payment of expenses incurred in printing specifications and advertising for proposals for removal of wrecks obstructing the navigable channel of Bayou Teche, Louisiana.

An allotment of $700 was made from this appropriation February 1, 1908, to be applied to payment of expenses incident to removel of wrecks from Bayou Teche, Louisiana.

An inspection of Bayou Teche early in November, 1907, disclosed several obstructions to navigation by sunken barges, etc., which had apparently been abandoned by their owners. A report regarding the obstruction was made to the Department by letter dated November 12, 1907, submitting a form of advertisement giving notice to the owner or owners of the wrecks that if the same were not removed within thirty days they would be broken up and removed by the United States. The advertisement and recommendation contained in the above-named letter were approved by the Department December 7, 1907, and an allotment of $700 was made for the purpose of defraying the expenses necessary for doing the work.

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The notice to the owner or owners of the wrecks was duly published for a period of thirty days, from December 14, 1907, in the St. Mary Banner, Franklin, La., and the Enterprise, New Iberia, La.

No action was taken by the owner or owners of the wrecks looking to their removal, hence a contract was entered into with C. M. Guess, jr., New Iberia, La., January 27, 1908, and approved by the Department February 12, 1908, the same providing for the removal of six wrecks as follows:

Old floating barge near Calumet plantation.
Old sunken barge at Puckett shipyard.
Old barge below Belleview bridge.
Wreck of steam launch near Sarah bridge.
Old barge near Sarah bridge.
Old hull of boat near Franklin, La.

The work was commenced February 24 and completed March 5, 1908, all of the wrecks having been removed except the old hull of boat near Franklin, La., which could not be located by the contractor.

The total amount earned by the contractor was $650. The remainder of the allotment, $50, was used in making payment of expenses of inspector engaged in connection with the work.

ABSTRACT OF CONTRACTS IN FORCE DURING FISCAL YEAR ENDING JUNE 30, 1908.

Name and address of contractor: C. M. Guess, jr., New Iberia, La.
Work: Removing wrecks from Bayou Teche, Louisiana.
Contract price: $700 for six wrecks.
Date of contract: January 27, 1908.
Date of approval: February 12, 1908.
Date of commencement: February 24, 1908.
Date of expiration: March 5, 1908.

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APPENDIX T.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SECOND NEW ORLEANS, LOUISIANA, DISTRICT.

REPORT OF MAJ. J. F. McINDOE, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Homochitto River, Mississippi.
2. Bogue Chitto, Chefuncte River, and Bogue Falia, Tickfaw River and tributaries, and Amite River, and Bayou Manchac, Louisiana.
3. Bayou Plaquemine, Grand River, and Pigeon Bayou, Louisiana.
4. Inland waterway from Franklin to Mermentau, Louisiana.
5. Channel, bay, and passes of Bayou Vermilion and Mermentau River and tributaries, Louisiana.
6. Mouth and passes of Calcasieu River, Louisiana.
7. Removing water hyacinths from Louisiana waters.

UNITED STATES ENGINEER OFFICE,
New Orleans, La., July 2, 1908.

SIR: I have the honor to submit herewith annual report upon the work of river and harbor improvement in the Gulf Division in my charge for the fiscal year ending June 30, 1908.

* * * * * * *

Very respectfully, your obedient servant,

J. F. McINDOE,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

T 1.

IMPROVEMENT OF HOMOCHITTO RIVER, MISSISSIPPI.

For history of this work, project, and results accomplished, see current summary, page 432; also Annual Report of the Chief of Engineers for 1905, page 1457.

No work was done during the fiscal year ending June 30, 1908.

Under project approved April 3, 1907, it was proposed to apply about $5,000 to the construction of a combined dredge and snag boat for the maintenance of the improvement. Plans and specifications

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for this boat were completed and submitted on August 23, 1907. Bids for its construction were opened on November 20, 1907, and contract entered into under date of December 17, 1907, with M. A. Sweeney Shipyard and Foundry Company.

There was expended during the year for preparation of plans, printing, and advertising, $19.09.

Money statement.

July 1, 1907, balance unexpended	$6,332.19
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	19.09
July 1, 1908, balance unexpended	6,313.10

APPROPRIATIONS.

March 3, 1899	$16,000	March 2, 1907	$4,000
June 13, 1902	2,000		
March 3, 1905	2,000	Total	24,000

CONTRACT IN FORCE.

Name and address of contractor: M. A. Sweeney Shipyard and Foundry Company, Jeffersonville, Ind.
Work: Construction of combined dredge and snag boat.
Price: $37,400.
Date of approval: January 29, 1908.
Date of beginning work: March 2, 1908.
Date of expiration: December 1, 1908.

COMMERCIAL STATISTICS.

[From January 1, 1907, to December 31, 1907.]

Shipments by water.

[No boats ply regularly on this river. All timber is rafted.]

No detailed commercial statistics for the calendar year 1907 were available. Circular letters and blank forms were sent out, but no replies were received.

T 2.

IMPROVEMENT OF BOGUE CHITTO, CHEFUNCTE RIVER, BOGUE FALIA, TICKFAW RIVER AND TRIBUTARIES, AMITE RIVER, AND BAYOU MANCHAC, LOUISIANA.

(A) BOGUE CHITTO.

For history of this work, project, and results accomplished, see current summary, page 433; also Annual Report of the Chief of Engineers for 1905, page 1458.

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No work was done during the fiscal year ending June 30, 1908, no funds being available.

Reference is invited to recommendation in current summary, page 433, that appropriations for this stream be discontinued.

Money statement.

Amount (estimated) required for completion of existing project..... $30,000

APPROPRIATIONS.

September 19, 1890	$5,000.00	April 8, 1907, amount transferred to improving Tickfaw River and tributaries	$157.46
July 13, 1892	5,000.00		
August 18, 1894	5,000.00		
June 3, 1896	5,000.00		
March 3, 1899	5,000.00	Total balance	27,842.54
June 13, 1902 (allotted June 30, 1902)	3,000.00		
Total	28,000.00		

COMMERCIAL STATISTICS.

[From January 1, 1907, to December 31, 1907.]

No boats ply regularly on this river. All timber is rafted.

(B) CHEFUNCTE RIVER AND BOGUE FALIA.

For history of this work, project, and results accomplished, see current summary, page 433, and Annual Report of the Chief of Engineers for 1905, page 1459.

No field work was done during the fiscal year ending June 30, 1908. Under project approved April 11, 1907, it is provided that about $5,000 shall be applied to the construction of a combined dredge and snag boat for the maintenance of the improvement and the balance of available funds to engineering contingencies and to the operation of this boat for the removal of bars and such snags, logs, and overhanging trees as interfere with navigation between the mouth of the Chefuncte and Covington on the Bogue Falia.

Plans and specifications for this boat were completed and submitted August 23, 1907. Bids for its construction were opened November 20, 1907, and contract entered into under date of December 17, 1907, with M. A. Sweeney Shipyard and Foundry Company. There was expended during the year for preparation of plans, inspection of construction of boat, printing, advertising, and for collection of commercial statistics, $177.23.

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Money statement.

July 1, 1907, balance unexpended	$8,441.25
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	177.23
July 1, 1908, balance unexpended	8,264.02
July 1, 1908, amount covered by uncompleted contracts	5,000.00

APPROPRIATIONS.

March 3, 1881	$1,500.00	March 2, 1907 (allotted April 8, 1907)	$8,000.00
August 2, 1882	1,500.00		
August 5, 1886	2,500.00		
September 19, 1890	1,000.00	Total	22,000.00
July 13, 1892	1,000.00	February 24, 1903, amount transferred to allotment for "Improving Amite River and Bayou Manchac, Louisiana"	1,194.01
August 18, 1894	1,000.00		
June 3, 1896	1,000.00		
March 3, 1899	1,000.00		
June 13, 1902	3,000.00		
March 3, 1905 (allotted May 5, 1905)	500.00	Total balance	20,805.99

CONTRACT IN FORCE.

Name and address of contractor: M. A. Sweeney Shipyard and Foundry Company, Jeffersonville, Ind.
Work: Construction of combined dredge and snag boat.
Price: $37,400.
Date of approval: January 29, 1908.
Date of beginning work: March 2, 1908.
Date of expiration: December 1, 1908.

COMMERCIAL STATISTICS.

[From January 1, 1907, to December 31, 1907.]

Vessels entering and departing.

Class.	Number.	Trips.	Net registered tonnage.
Steamers	12	1,643	345
Sailing vessels	20	1,014	414
Barges	34	1,512	2,845
Total	66	4,169	3,604

Shipments and receipts by water.

Articles.	Tons.	Value.
Lumber	24,713	$247,132
Piling	2,497	8,688
Sand, brick, and clay	180,969	150,506
Rosin, turpentine, and tar	985	12,678
Fuel, wood	1,000	4,500
Hides, skins, furs, and wool	3	1,480
Live stock	86	25,875
Miscellaneous freight	10,488	524,400
Junk	155	1,550
Cotton, bales	163	35,515
Molasses and rice	168	6,720
Total	221,172	1,019,042

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(c) TICKFAW RIVER AND TRIBUTARIES, LOUISIANA.

For history of this work, projects, and results accomplished, see current summary, page 435, and Annual Report of the Chief of Engineers for 1906, page 1313.

No fieldwork was done during the fiscal year ending June 30, 1908. Under project approved April 11, 1907, it is provided that about $5,000 shall be applied to the construction of a combined dredge and snag boat for the maintenance of the improvement and the balance of available funds to engineering contingencies and to the operation of this boat for the removal of bars and such snags, logs, and overhanging trees as interfere with navigation between the mouth of the Tickfaw and the head of navigation in each of the tributaries.

Plans and specifications for this boat were completed and submitted August 23, 1907. Bids for its construction were opened November 20, 1907, and contract entered into under date of December 17, 1907, with M. A. Sweeney Shipyard and Foundry Company. There was expended during the year for preparation of plans, inspection of construction of boat, printing, advertising, and for collecting commercial statistics, $166.51.

Money statement.

July 1, 1907, balance unexpended	$6,166.51
June 30, 1908, amount expended during fiscal year for maintenance of improvement	166.51
July 1, 1908, balance unexpended	6,000.00
July 1, 1908, amount covered by uncompleted contracts	5,000.00

APPROPRIATIONS.

March 3, 1881	$2,000.00	March 2, 1907 (allotted April 8, 1907)	$6,000.00
August 2, 1882	2,000.00		
August 5, 1886	2,000.00		20,000.00
August 11, 1888	1,000.00		
September 19, 1890	1,000.00	April 8, 1907, amount transferred from allotment for "Improving Bogue Chitto, Louisiana"	157.46
July 13, 1892	1,000.00		
August 18, 1894	1,000.00		
June 3, 1896	1,000.00	Total	20,157.46
March 3, 1899	1,000.00		
June 13, 1902 (allotted June 20, 1902)	1,000.00		
March 3, 1905 (allotted May 5, 1905)	1,000.00		

CONTRACT IN FORCE.

Name and address of contractor: M. A. Sweeney Shipyard and Foundry Company, Jeffersonville, Ind.
Work: Construction of combined dredge and snag boat.
Price: $37,400.
Date of approval: January 29, 1908.
Date of beginning work: March 2, 1908.
Date of expiration: December 1, 1908.

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COMMERCIAL STATISTICS.

Vessels entering and departing.

Class.	Number.	Trips.	Net registered tonnage.
Steamers	7	322	121
Sailing vessels	22	432	437
Barges	1	26	78
Total	30	780	636

Receipts and shipments by water.

Articles.	Tons.	Value.
Lumber	34,002	$339,169
Logs	4,613	9,672
Wood, fuel	2,246	3,994
Poultry and eggs	1	157
Cotton, bales	28	6,169
Hides and wool	3	763
Shingles and laths	4	20
Live stock	10	3,074
Brick	65	2,000
Rice	7	600
Staves	420	3,400
Miscellaneous freight	2,951	147,950
Total	44,350	527,495

(D) AMITE RIVER AND BAYOU MANCHAC, LOUISIANA.

For history of this work, projects, and results accomplished, see current summary, page 436, and Annual Report of the Chief of Engineers for 1906, page 1314.

No field work was done during the fiscal year ending June 30, 1908. Under project approved April 11, 1907, it is provided that about $10,000 shall be applied to construction of a combined dredge and snag boat for the maintenance of the improvement, and the balance of the available funds to engineering contingencies and to the operation of this boat for the removal of bars at the mouth of Bayou Manchac and at the mouth of Amite River, and such snags, logs, and overhanging trees as interfere with navigation.

Plans and specifications for this boat were completed and submitted August 23, 1907. Bids for its construction were opened November 20, 1907, and contract entered into under date of December 17, 1907, with M. A. Sweeney Shipyard and Foundry Company. There was expended during the year for preparation of plans, inspection of construction of boat, printing, advertising, and for collecting commercial statistics, $165.69.

Money statement.

July 1, 1907, balance unexpended	$20,377.02
June 30, 1908, amount expended during fiscal year for maintenance of improvement	165.69
July 1, 1908, balance unexpended	20,211.33
July 1, 1908, amount covered by uncompleted contracts	7,400.00

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APPROPRIATIONS.

June 14, 1880	$8,000.00	March 2, 1907 (allotted April 8, 1907)	$20,000.00
March 3, 1881	5,000.00		
August 5, 1886	2,000.00		
August 11, 1888	5,000.00	Total	61,800.00
September 19, 1890	8,800.00	February 24, 1908, amount transferred from allotment for "Improving Chefuncte River and Bogue Falia, Louisiana"	1,194.01
July 13, 1892	2,500.00		
August 18, 1894	2,500.00		
June 3, 1895	2,500.00		
March 3, 1899	2,500.00		
June 13, 1902 (allotted June 20, 1902)	2,500.00	Total	62,994.01
March 3, 1905 (allotted May 5, 1905)	2,500.00		

CONTRACT IN FORCE.

Name and address of contractor: M. A. Sweeney Shipyard and Foundry Company, Jeffersonville, Ind.
Work: Construction of combined dredge and snag boat.
Price: $37,400.
Date of approval: January 29, 1908.
Date of beginning work: March 2, 1908.
Date of expiration: December 1, 1908.

COMMERCIAL STATISTICS.

Vessels entering and departing.

Class.	Number.	Trips.	Net registered tonnage.
Steamers	10	451	228
Sailing vessels	14	433	183
Barges	1	2	87
Total	25	886	498

Shipments and receipts by water.

Articles.	Tons.	Value.
Lumber	25,413	$257,417
Logs	4,050	21,600
Shingles and laths	1,765	23,060
Staves	5,866	88,002
Cotton and cotton seed	1,263	174,065
Hides, furs, wool, and moss	16	4,670
Wood, fuel	3,212	12,848
Poultry and eggs	15	4,568
Live stock	12	1,400
Brick and clay	88	1,201
Miscellaneous freight	3,902	195,100
Total	45,552	883,926

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T 3.

IMPROVEMENT OF BAYOU PLAQUEMINE, GRAND RIVER, AND PIGEON BAYOUS, LOUISIANA.

For history of this work, projects, and results accomplished, see current summary, page 437, and Annual Report of the Chief of Engineers for 1904, page 1895. This work was in charge of Col. E. H. Ruffner, Corps of Engineers, until February 29, 1908, and of Maj. J. F. McIndoe, Corps of Engineers, since that date.

LOCK AND APPROACHES.

Plaquemine Lock.—The pumping plant has been operated as required during the year to keep the lock pit free of water during the progress of work under contract. A force of laborers has also been employed, as required, for the purpose of cleaning the lock chamber of sediment washed in during heavy rains and of cleaning the sills for the periodical measurements to determine settlement and spread of walls. For description of pumping plant, see Annual Report for 1907, page 1419.

Emergency work.—A Board of Engineer officers constituted by Special Orders, No. 20, Office Chief of Engineers, May 7, 1907, to examine and report upon certain matters connected with this improvement, visited the work and submitted its report under date of May 24, 1907.

To remedy the defects in the lock the Board made the following suggestions and recommendations, which were approved by the Chief of Engineers, June 1, 1907: (1) The back filling of earth behind the lock and wing walls should be put in as quickly as possible; (2) that during this back filling the tops of the lock walls should be tied together with strong rods and turn-buckles, the tie-rods to be put in position as soon as possible and to be left in position until the lock is ready to be operated; (3) that as soon as the back filling is completed, the lower lock-gate joints should be calked and the lock filled with water and left so for at least a month, after which the lock should be emptied and the gates readjusted.

In order to enable these recommendations to be carried out, the Secretary of War, on June 29, 1907, allotted funds as follows: From emergency appropriation, act of March 3, 1905, $10,000; from emergency appropriation, act of March 2, 1907, $10,000; from appropriation for operating and care of canals, act of July 5, 1884, $15,000.

Specifications for the back filling were submitted August 2, 1907; the work was advertised, but no bids were received at time fixed for the opening, September 16. An order was placed for the necessary steel and turn-buckles in August, and at the same time the work of drilling holes for the tie-rods was commenced. On account of delay in delivery, the placing of tie-rods was not completed until in October.

The Board referred to above was reconvened by Special Orders, No. 51, Office Chief of Engineers, December 19, 1907, and inspected the work at Plaquemine on January 14, 1908. In its report of January 15, the Board renewed its recommendation that the back filling be completed as soon as possible, after readvertising the work; recommended that thirty to forty more tie-rods should be immedi-

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ately added in the vicinity of the quoins and gate recesses and that supplemental contract of November 15, 1907, should be approved, extending the time limit for completion of contract of August 7, 1906, until such time as the recommendations of the Board can be carried out.

Bids for the back filling were opened February 14, 1908, but were rejected by the Chief of Engineers. Under date of March 8, 1908, a supplemental contract was entered into with W. O. Burton & Co. to place the back filling, getting the earth from an old levee about 1,500 feet from the lock. The work was commenced March 17 and was completed April 28, 1908, a total of 24,203 cubic yards being placed at contract price of 95 cents per cubic yard.

Under date of February 24 a contract was entered into with A. Baldwin & Co., of New Orleans, to deliver the steel rods and turnbuckles, delivery to be completed by March 17. The steel bars were not delivered until April 4 and the turn-buckles until April 25, at which time the back filling had practically been completed and the extra tie-rods could not be placed without expensive reexcavation. They were therefore omitted.

The fitting and calking of the lower gate was completed on May 11 and also the removal of the contractor's machinery. On May 12 the U. S. dredge *The Ram* commenced pumping from the river to fill the lock for the water test. The leakage under and around the gate and through the rivet holes was found to be very great and it soon became apparent that the dredge could not alone fill the lock. By adding an 18-inch siphon the lock was filled to a depth of 33 feet, or 13 feet above the level in the bayou, but the leakage continued so great that a second siphon was put in operation May 30. Later a cut was made in the levee and two 15-inch and one 18-inch pipe placed so as to allow direct flow of water from the Mississippi River into the fore bay. By these means a depth of 43 feet of water was obtained in the lock and maintained until the end of June.

Settlement of lock walls.—Reference is invited to page 1422, Annual Report for 1907, for record of settlement of sills and spread of the walls.

Levels taken February 29 showed that the settlement had continued, but levels taken March 31, April 30, and May 11 showed that as the back filling was placed there was a slight rising of the sills.

SILL NO. 1.

	A.	B.	C.	D.	E.
Total settlement to June 17, 1907	0.889	0.433	0.421	0.587	0.724
June 17, 1907, to February 29, 1908	.094	.063	.037	.052	.126
February 29, 1908, to May 11, 1908	— .084	— .086	— .084	— .074	— .075
Total settlement in feet	.899	.410	.374	.515	.775

SILL NO. 2.

Total settlement to June 17, 1907	0.889	0.557	0.518	0.628	0.810
June 17, 1907, to February 29, 1908	.083	.052	.056	.091	.151
February 29, 1908, to May 11, 1908	— .048	— .070	— .078	— .021	— .064
Total settlement in feet	.924	.539	.496	.698	.897

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SILL NO. 3.

	A.	B.	C.	D.	E.
Total settlement to June 17, 1907	0.680	0.460	0.266	0.407	0.582
June 17, 1907, to February 29, 1908	.079	.050	.023	.057	.120
February 29, 1908, to May 11, 1908	− .033	− .052	− .059	+ .006	− .066
Total settlement in feet	.726	.458	.230	.480	.636

SILL NO. 4.

Total settlement to June 17, 1907	0.662	0.399	0.271	0.469	0.570
June 17, 1907, to February 29, 1908	.041	.021	.012	.050	.068
February 29, 1908, to May 11, 1908	− .028	− .048	− .057	− .047	− .060
Total settlement in feet	.675	.372	.226	.481	.618

SILL NO. 5.

Total settlement to June 17, 1907	0.614	0.443	0.267	0.456	0.597
June 17, 1907, to February 29, 1908	.017	.008	.002	.037	.065
February 29, 1908, to May 11, 1908	− .024	− .045	− .061	− .052	− .064
Total settlement in feet	.607	.406	.208	.441	.598

After the water was pumped into the lock for the water test it was no longer practicable to test the sills. Bench marks were therefore established on the tops of the walls. There was a uniform subsidence of 0.0528 foot between May 16 and June 15, but no change between June 15 and June 26. There has been no appreciable spread of the walls since May 12, 1908.

The following table shows the distances between miter posts, gates closed, and the increase since June 17, 1907:

Observation taken.	Gate 1.		Gate 2.		Gate 3.		Gate 4.		Temperature.
	Top.	Bottom.	Top.	Bottom.	Top.	Bottom.	Top.	Bottom.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	°
June 17, 1907	6 1/16	1 1/2	7 1/2	1 5/16	5 11/16	1 11/16	6 1/2	1 1/2	58
April 30, 1908	11 7/16	1 1/2	13 1/16	2 5/16	12	2 5/16	12 5/16	2	62
Increase	5 1/2	1/2	5 9/16	1/2	6 5/16	1/2	5 13/16	1/2	

Excavation and construction of the bayou approach and portion of the river approach.—The contract with Messrs. W. O. Burton & Co., of New Orleans, La., dated June 6, 1905, provides for the excavation and construction of the approach to the lock at the bayou end and for a portion of the approach at the river end.

Work was commenced on the ground October 10, 1905, and was completed in February, 1908. During the fiscal year 9,439 cubic yards of earth were excavated and placed behind the lock walls, at 40 cents per cubic yard, 798 50-foot piles were furnished and driven, at $12.50 per pile, and 1,945 cubic yards of concrete were furnished and placed in walls, at $5.50 per cubic yard. The total expended under this contract during the year was $34,153.76, making the total expended $120,485.35.

Completion of river approach.—The contract with W. O. Burton & Co., of New Orleans, dated August 7, 1906, provides for the completion of the river approach. Work was commenced in September,

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1906, and was continued until February, 1908, when it was temporarily suspended. By supplemental agreement dated November 15, 1907, approved January 22, 1908, time limit for completion of the contract has been extended until such time as the recommendations of the Board referred to above can be carried out. During the fiscal year 18,638 cubic yards of earth were excavated from the river approach and placed behind the lock and approach walls, at $1.05 per cubic yard; cement was furnished for and 2,643 cubic yards of concrete mixed and placed in approach walls for $3 per cubic yard; 2,420 cubic yards of gravel and sand were furnished, at $2 per cubic yard; 594 50-foot piles were furnished, at $3 per pile, and 1,143 piles were driven, at $1.50 per pile.

BAYOU PLAQUEMINE, GRAND RIVER AND PIGEON BAYOUS.

No work was done during the year under the contracts with Charles Clarke & Co., of Galveston, Tex., for dredging in Bayou Plaquemine. Under the terms of the supplemental contract approved April 11, 1905, work is suspended until the lock is open to navigation, when dredging will be resumed and the material deposited in deep water of the Mississippi River.

The act of July 13, 1892, included in the general project for improving Bayou Plaquemine, the improvement of Grand River and Pigeon bayous, to extend the navigable waterway to Bayou Teche. Since that date these streams have been cleared of obstructions by snagging and dredging, and a channel 50 feet wide and 10 feet deep was dredged through Flat Lake and Bay Natchez under contract. This channel was dredged with perpendicular sides, allowing the bank to take its own slope, and shoaling has taken place in portions of the channel. Recent developments also indicate that Grand River above Bay Natchez for a distance of 3 or 4 miles has shoaled. The present width of channel is inadequate for the proper accommodation of the commerce which will utilize this route with the opening of the lock at Plaquemine. The dredging in Bayou Plaquemine will be completed to afford a channel 10 feet deep and 125 feet wide, and it is believed that this width of channel should be provided for the route through Grand River. At the time of dredging the 50-foot channel, however, the funds available for this portion of the project would not permit of the expenditure necessary to procure the wider channel.

Money statement.

July 1, 1907, balance unexpended		$371,948.19
Amount allotted		15,000.00
June 29, 1907, from appropriation for operating and care of canals, act of July 5, 1884		386,948.19
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$101,808.36	
For maintenance of improvement	9,325.30	
Treasury settlement	38.70	
		111,172.36
July 1, 1908, balance unexpended		275,775.83
July 1, 1908, outstanding liabilities		1,287.70
July 1, 1908, balance available		274,488.13
July 1, 1908, amount covered by uncompleted contracts		143,079.36

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APPROPRIATIONS.

August 11, 1888	$100,000	June 29, 1907, allotted from emergency appropriation, act of March 3, 1905	$10,000
September 19, 1890	100,000		
July 13, 1892	150,000		
August 18, 1894	110,000	June 29, 1907, allotted from emergency appropriation, act of March 2, 1907	10,000
June 3, 1896	20,000		
June 4, 1897	350,000		
March 3, 1899	400,000	June 29, 1907, allotted from appropriation, operating and care of canals, act of July 5, 1884	15,000
June 6, 1900	200,000		
March 3, 1901	210,000		
March 3, 1905	35,000		
June 30, 1906	100,000		
March 2, 1907	100,000	Total	1,910,000

CONTRACTS IN FORCE.

I.

Name and address of contractor: Charles Clarke & Co., Galveston, Tex.

Work: Dredging to enlarge bed of Bayou Plaquemine from the railroad bridge to deep water below Dardennes Bend. Estimated amount of material to be removed, 1,027,509 cubic yards.

Contract price: 13.98 cents per cubic yard.

Date of contract: July 15, 1899.

Date of approval: September 13, 1899.

Date of commencement: November 12, 1899.

Date of expiration: June 30, 1901; extended to June 30, 1902; time limit waived.

II.

Name and address of contractor: Charles Clarke & Co., Galveston, Tex.

Work: Provides for modification of method of work on contract of July 15, 1899, for enlarging bed of Bayou Plaquemine and for certain additional work, no change in contract price being involved. Estimated number of additional cubic yards of material provided for by this supplemental contract, 80,000.

Date of contract: March 30, 1905.

Date of approval: By the Chief of Engineers, April 11, 1905; by the Secretary of War, April 11, 1905.

Supplemental contract.

III.

Name and address of contractor: W. O. Burton & Co., New Orleans, La.

Work: Excavation and construction of approaches to the lock.

Date of contract: June 6, 1905.

Date of approval: June 19, 1905.

Date of commencement: August 19, 1905.

Date of expiration: January 19, 1906; time limit waived. Completed February, 1908.

Unit prices: Excavation, 40 cents per cubic yard; 50-foot piles, $12.50 each; 35-foot piles, $8.75 each; concrete, $5.50 per cubic yard; snubbing posts, $20 each.

IV.

Name and address of contractor: W. O. Burton & Co., New Orleans, La.

Work: Excavation and construction of river approach and back fill of lock at Plaquemine, La.

Contract price: Moving levee, 30 cents per cubic yard; sand and gravel or broken stone for concrete, $2 per cubic yard; furnishing cement for concrete, mixing and placing concrete, $3 per cubic yard; piles, $3 each; driving piles, $1.50 per pile; excavating for approach and placing earth, $1.05 per cubic yard; furnishing and setting in place guide piles, $75 per cluster.

Date of contract: August 7, 1906.

Date of approval: August 29, 1906.

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Date of commencement: September 25, 1906.
Date of expiration: Four months from the time after May 1, 1907, that the Mississippi River gauge reads 20 feet at Plaquemine, La. (See No. VI, below.)

V.

Name and address of contractor: Chas. Clarke & Co., Galveston, Tex.
Work: Dredging 45,000 cubic yards of earth at river approach, Plaquemine lock.
Contract price: 13.98 cents per cubic yard.
Date of contract: August 25, 1906.
Date of approval: August 30, 1906.
Date of commencement: Not yet commenced. The work under this contract is to be done at the same time and in connection with the completion of contract dated July 15, 1899, for dredging and enlarging bed of Bayou Plaquemine.
Supplemental contract.

VI.

Name and address of contractor: W. O. Burton & Co., New Orleans, La.
Work: Provides for extension of time limit for completion of contract of August 7, 1906, until such time as recommendations of Board of Engineers can be carried out.
No change in contract prices involved.
Date of contract: November 15, 1907.
Date of approval: By Chief of Engineers, January 21, 1908; by Secretary of War, January 22, 1908.
Supplemental contract.

VII.

Name and address of contractor: A. Baldwin & Co. (Limited), New Orleans, La.
Work: Furnishing steel and turn-buckles for work at Plaquemine.
Contract prices: Steel, 130 pieces; approximate weight, 42,000 pounds, at $2.09 per 100 pounds; turn-buckles, $2.54 each.
Date of contract: February 24, 1908.
Date of approval: Emergency.
Date of beginning work: February 24, 1908.
Date of expiration: March 17, 1908.

VIII.

Name and address of contractor: W. O. Burton & Co., New Orleans, La.
Work: Placing about 20,000 cubic yards back fill behind lock and wing walls.
Unit price: 95 cents per cubic yard.
Date of contract: March 8, 1908.
Date of approval: By Chief of Engineers, March 19, 1908; by Secretary of War, March 20, 1908.
Date of beginning work: March 17, 1908.
Date of expiration: Work completed April 28, 1908.
Supplemental contract.

COMMERCIAL STATISTICS FROM JANUARY 1, 1907, TO DECEMBER 31, 1907.

PLAQUEMINE BAYOU AND GRAND RIVER.

Vessels entering and departing.

Class.	Number.	Trips.	Net registered tonnage.
Steamers	22	876	883
Barges	18	440	1,620
Total	40	1,316	2,503

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Shipments and receipts by water.

Articles.	Tons.
Lumber	4,000
Logs	219,000
Staves	3,000
Cotton	13
Hides, furs, and moss	235
Wood, fuel	5,200
Oil	300,465
Sugar cane	300
Fish	311
Molasses	20
Miscellaneous freight	2,200
Total	534,744

T 4.

IMPROVEMENT OF INLAND WATERWAY, FRANKLIN TO MERMI LOUISIANA.

For general project for this work, see current summary, pa also House Document No. 640, Fifty-ninth Congress, second

Under project approved April 16, 1907, it was proposed to survey of location for making borings to determine the na material to be encountered along the route and for securing t necessary for preparation of deeds for right of way and for pl specifications for the work.

After securing promises from the owners of lands lying al route between the Mermentau and Vermilion rivers that they donate the right of way for the proposed channel, the surv commenced on May 16, but owing to excessive rainfall and th flowed condition of the land it became necessary to suspend ope on June 13. Five routes for the channel between Bayou Tec Vermilion Bay have been examined.

The survey was resumed July 16, 1907, and in October the of that part of the route lying west of Vermilion Bay was com when the party was transferred to Bayou Portage to conti survey to Franklin on Bayou Teche. In November the surv discontinued for the reason that property owners near Frank failed to guarantee the requisite right of way through their la

Maps of the route west of Vermilion Bay were prepared scriptions of the desired right of way were furnished propert ers for insertion in the deeds. The proposed waterway wi through lands under the control of parish school boards and bo drainage commissioners, and while these boards are willing to the right of way desired it was found that the State law d authorize such donation. At the session of the State legisla May, 1908, acts granting the necessary authority were introduc passed.

Near Franklin the proposed waterway must cross the line Southern Pacific Railway, probably at the point where the crosses Bayou Yokely, and it has been decided by the War ment that the cost of the necessary bridge must be borne United States.

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The survey of location was resumed June 22, 1908. Plans of so much of the route as lies between Vermilion Bay and Grand Lake were submitted for approval on June 30, 1908, and specifications for dredging this part of the channel have been prepared.

Money statement.

July 1, 1907, balance unexpended	$88,093.79
Amount appropriated by sundry civil act approved May 27, 1908	100,000.00
	188,093.79
June 30, 1908, amount expended during fiscal year, for works of improvement	5,716.71
July 1, 1908, balance unexpended	182,377.08
Amount (estimated) required for completion of existing project	100,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	100,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATIONS.

March 2, 1907	$89,292
May 27, 1908	100,000
Total	189,292

T 5.

IMPROVEMENT OF CHANNEL, BAY, AND PASSES OF BAYOU VERMILION AND MERMENTAU RIVER AND TRIBUTARIES, LOUISIANA.

(A) CHANNEL, BAY, AND PASSES OF BAYOU VERMILION.

For history of this work, projects, and results accomplished, see current summary, page 442, and Annual Report of the Chief of Engineers for 1905, page 1463.

No field work was done during the fiscal year until June 11. Advantage was taken of the presence of the U. S. steamer *Hyacinth* engaged in spraying hyacinths in Bayou Vermilion, and between June 11 and 18 this boat removed 11 snags and fallen trees and 1 coal-boat gunwale which were obstructing navigation below Abbeville. Under project approved April 11, 1907, it is provided that about $5,000 shall be applied to the construction of a combined dredge and snag boat for the maintenance of the improvement and the balance of available funds to engineering contingencies and to the operation of this boat for the removal of bars and such snags, logs, and overhanging trees as interfere with navigation in the channel, bay, and passes of Bayou Vermilion.

Plans and specifications for this boat were completed and submitted August 23, 1907. Bids for its construction were opened

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November 20, 1907, and contract entered into under date of De
17, 1907, with M. A. Sweeney Shipyard and Foundry Co
There was expended during the year for preparation of pl
spection of construction of boat, printing, advertising, and
lection of commercial statistics $52.56.

A preliminary examination of Bayou Vermilion was made i
ber, 1907, in accordance with river and harbor act of March
and a survey of the upper part of the bayou in May, 1908.

Money statement.

July 1, 1907, balance unexpended	$
June 30, 1908, amount expended during fiscal year for maintenance of improvement	
July 1, 1908, balance unexpended	
July 1, 1908, amount covered by uncompleted contracts	

APPROPRIATIONS.

June 14, 1880	$5,000	March 2, 1907 (allotted April 3 1907)	
March 3, 1881	4,900	December 31, 1903, amount transferred from allotment for "Improving Mermentau River and tributaries, Louisiana"	
July 13, 1892	7,500		
August 18, 1894	5,000		
June 3, 1896	1,000	Total	
March 3, 1899	2,500		
June 13, 1902 (allotted July 16, 1902)	9,000		
March 3, 1905 (allotted May 23, 1905)	1,000		

CONTRACT IN FORCE.

Name and address of contractor: M. A. Sweeney Shipyard and Found
pany, Jeffersonville, Ind.
Work: Construction of combined dredge and snag boat.
Contract price: $37,400.
Date of approval: January 29, 1908.
Date of beginning work: March 2, 1908.
Date of expiration: December 1, 1908.

COMMERCIAL STATISTICS.

Vessels entering and departing.

Class.	Number.	Trips.	
Steamers	1	152	
Barges	11	150	
Total	12	302	

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Shipments and receipts by water.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
SHIPMENTS.			RECEIPTS.		
Sugar cane	18,000	$72,000	Fuel oil	3,300	$21,000
Rice	2,700	105,000	Merchandise and feed	1,230	90,600
Cotton and cotton seed	3,135	339,350	Lumber and shingles	400	7,550
Sugar and molasses	1,375	91,250	Brick, sand, and shells	725	2,750
Cord wood	5,000	17,500	Coal	900	4,500
Cattle and hides	520	32,400	Machinery	50	5,000
			Fertilizer	180	3,600
Total	30,730	657,500	Total	6,785	135,000

Grand total, 37,515 tons, valued at $792,500.

(B) MERMENTAU RIVER AND TRIBUTARIES, LOUISIANA.

For history of this work, projects, and results accomplished, see current summary, page 443, and Annual Report of the Chief of Engineers for 1906, page 1316.

No field work was done during the fiscal year ending June 30, 1908. Under project approved April 5, 1907, it is provided that about $10,000 shall be applied to the construction of a combined dredge and snag boat for the maintenance of the improvement, and the balance of available funds to engineering contingencies and to the operation of this boat for the removal of such snags, logs, and overhanging trees as interfere with navigation between the mouth of the Mermentau River and the head of navigation in its tributaries.

Plans and specifications for this boat were completed and submitted August 23, 1907. Bids for its construction were opened November 20, 1907, and contract entered into under date of December 17, 1907, with M. A. Sweeney Shipyard and Foundry Company. There was expended during the year for preparation of plans, inspection of construction of boat, printing, advertising, and for collection of commercial statistics, $112.25.

Money statement.

July 1, 1907, balance unexpended	$18,180.78
June 30, 1908, amount expended during fiscal year for maintenance of improvement	112.25
July 1, 1908, balance unexpended	18,068.53
July 1, 1908, amount covered by uncompleted contracts	7,500.00

APPROPRIATIONS.

July 13, 1892	$7,500.00
August 18, 1894	5,000.00
June 3, 1896	5,000.00
March 3, 1899	6,115.25
June 13, 1902	2,500.00
March 3, 1905 (allotted)	2,000.00
March 2, 1907 (allotted)	18,000.00
Total	46,115.25
December 31, 1903, amount transferred to allotment for "Improving channel, bay, and passes of Bayou Vermilion, Louisiana"	200.00
Total	45,915.25

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CONTRACT IN FORCE.

Name and address of contractor: M. A. Sweeney Shipyard and Foundry Company, Jeffersonville, Ind.
Work: Construction of combined dredge and snag boat.
Price: $37,400.
Date of approval: January 29, 1908.
Date of beginning work: March 2, 1908.
Date of expiration: December 31, 1908.

COMMERCIAL STATISTICS FROM JANUARY 1, 1907, TO DECEMBER 31, 1907.

Vessels entering and departing.

Class.	Number.	Trips.	Net registered tonnage.
Steamers	6	434	6,704
Sailing vessels	6	78	1,835
Total	12	512	8,539

Shipments and receipts by water.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
SHIPMENTS.			RECEIPTS.		
Cotton and cotton seed	793	$67,270	Fuel oil	20,490	$104,060
Rice	9,500	369,442	Merchandise	1,766	132,450
Lumber	5,246	52,480	Fertilizer	1,200	24,000
Logs	8,000	16,000	Coal and cord wood	1,008	4,278
Cattle	403	24,180	Sand and shell	650	1,300
Hides and furs	60	13,125	Feed	300	6,000
Oranges	50	4,000	Machinery	200	20,000
			Miscellaneous	90	3,600
Total	24,052	546,497	Total	25,704	295,708

Grand total, 49,756 tons, valued at $842,205.

T 6.

IMPROVEMENT OF MOUTH AND PASSES OF CALCASIEU RIVER, LOUISIANA.

For history of this work, projects, and results accomplished, see current summary, page 445, and Annual Report of the Chief of Engineers for 1906, page 1318.

No field work was done during the fiscal year ending June 30, 1908. Under project approved April 2, 1907, it is provided that about $10,000 shall be applied to the construction of a combined dredge and snag boat for the maintenance of the improvement, and the balance of available funds to engineering contingencies and to the operation of this boat for the maintenance of the authorized channel depths at the mouth and passes of Calcasieu River.

Plans and specifications for this boat were completed and submitted August 23, 1907. Bids for its construction were opened

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November 20, 1907, and contract entered into under date of December 17, 1907, with M. A. Sweeney Shipyard and Foundry Company. There was expended during the year for preparation of plans, inspection of construction of boat, printing, advertising, and for collection of commercial statistics, $71.72.

Money statement.

July 1, 1907, balance unexpended	$24,998.00
Received, sale of blueprints	2.50
	25,000.50
June 30, 1908, amount expended during fiscal year for maintenance of improvement	71.72
July 1, 1908, balance unexpended	24,928.78

APPROPRIATIONS.

June 10, 1872	$15,000.00	March 3, 1905	$100,000.00
March 3, 1881	15,000.00	March 2, 1907	25,000.00
August 2, 1882	10,000.00		
July 5, 1884	6,500.00	Total	636,500.00
August 11, 1888	10,000.00	Refundment of overpayment	.45
September 19, 1890	75,000.00		
June 13, 1892	100,000.00	Receipts from sale of blueprints	2.50
August 18, 1894	90,000.00		
June 3, 1896	80,000.00		636,502.95
March 3, 1899	35,000.00		
June 18, 1902	75,000.00		

CONTRACT IN FORCE.

Name and address of contractor: M. A. Sweeney Shipyard and Foundry Company, Jeffersonville, Ind.
Work: Construction of combined dredge and snag boat.
Price: $37,400.
Date of approval: January 29, 1908.
Date of beginning work: March 2, 1908.
Date of expiration: December 31, 1908.

COMMERCIAL STATISTICS FROM JANUARY 1, 1907, TO DECEMBER 31, 1907.

Vessels entering and departing.

Class.	Number.	Trips.	Net registered tonnage.
Steamers	7	612	44,811
Sailing vessels	10	64	2,333
Barges	5	45	3,955
Total	22	721	51,099

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Shipments and receipts by water.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
SHIPMENTS.			RECEIPTS.		
Lumber and shingles	17,900	$162,000	Logs	321,000	$809,000
Rice	5,600	210,000	Machinery and railroad iron	1,002	56,000
Cotton and cotton seed	570	71,895	Merchandise	1,518	113,000
Cordwood	3,000	10,500	Fuel oil and coal	1,740	10,000
Sand and shell	2,500	5,000	Feed and fertilizer	515	10,300
Cattle	250	15,000	Brick, lime, and cement	140	1,000
Hides and furs	60	15,125			
Total	29,880	489,520	Total	325,915	994,000

Grand total, 355,795 tons, valued at $1,483,610.

T 7.

REMOVING THE WATER HYACINTH, LOUISIANA AND TEXAS.

For history of this work, projects, and results accomplished, see current summary, page 447, and Annual Report of the Chief of Engineers for 1906, page 1324.

On July 15, 1907, the steamer *Hyacinth* began spraying operations in Bayou des Allemands, which had again become blocked with hyacinths, carried into it from tributary streams by heavy rains and winds. It soon became evident that the work was too heavy for one boat and the steamer *Ramos* left New Orleans July 31. Both boats were operated in this stream until August 26, when it was opened up to navigation, after having been absolutely blocked for about six weeks. The *Hyacinth* continued operations in Bayou des Allemands until September 21.

The *Ramos* was withdrawn August 26, and on her way to New Orleans did some spraying in Bayou Barataria. After minor repairs the *Ramos* was operated in the streams comprising the Morgan City-Plaquemine route from September 1 to 14, when she was sent to Bayou Vermilion, which had become completely blocked with water hyacinths. The *Ramos* destroyed all obstructing hyacinths between September 15 and October 10.

The steamer *Hyacinth*, after slight repairs at New Orleans, was sent to Bayou Plaquemine, in which stream, Belle River, and Bayou Long she worked from October 1 to October 21, after which she returned to New Orleans and was put out of commission October 28, 1907.

A temporary boom was established in Bayou des Allemands in September and operated to November 7. The boom in Bayou Plaquemine was operated until November 12, 1907.

The use of the new solution referred to in the annual reports for 1905, 1906, and 1907 was continued with excellent results. During the season of 1907, April 15 to October 21, 507,622 gallons of chemical compound were used, at a cost of $0.0055 per gallon raw. Each gallon as sprayed, it is estimated, destroys about 10 square yards of water hyacinths.

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In April, 1908, it was reported that Bayou Barataria was completely blocked with water hyacinths for 1½ miles. The steamer *Hyacinth* left New Orleans April 15 and began spraying April 17. By May 9 the stream was thoroughly cleaned. She returned to New Orleans and after slight repairs left for Bayou Vermilion May 14, a petition having been received that the water hyacinths be destroyed on this stream and Little Bayou, one of its tributaries. Operations were commenced on May 20 and were still in progress on June 30. At this date Bayou Vermilion is practically cleared and spraying is confined to Little Bayou. It is expected to have Little Bayou cleaned by July 15.

Between April 17 and June 30, 124,236 gallons of chemical compound were sprayed, at a total cost of $0.0041 per gallon raw.

The operation of the hyacinth boom in Bayou Plaquemine was resumed April 1, 1908.

Money statement.

July 1, 1907, balance unexpended	$20,847.49
Received, sale of property	4.30
	20,851.79
June 30, 1908, amount expended during fiscal year for works of improvement	10,724.58
July 1, 1908, balance unexpended	10,127.21
July 1, 1908, outstanding liabilities	72.50
July 1, 1908, balance available	10,054.71
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	15,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

March 3, 1899	$36,000.00	Receipts from sales (condemned property)	$8.46
June 13, 1902 (allotted August 9, 1902)	18,000.00	Reimbursement for damages to hyacinth boom	102.53
September 26, 1902 (allotted September 26, 1902)	1,480.00	Grand total	121,090.99
December 4, 1903 (allotted December 4, 1903)	500.00	November 4, 1907, allotted to Buffalo Bayou, Texas	500.00
April 28, 1904 (allotted June 4, 1904)	15,000.00	Balance	120,590.99
March 3, 1905	40,000.00		
March 2, 1907	10,000.00		
Total	120,980.00		

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APPENDIX U.

IMPROVEMENT OF RIVERS AND HARBORS IN THE GALVESTON, TEXAS, DISTRICT.

REPORT OF CAPT. JOHN C. OAKES, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Galveston Harbor, Texas.
2. Galveston channel, Texas.
3. Channel from Galveston Harbor to Texas City, Texas.
4. Channel to Port Bolivar, Texas.
5. Galveston ship channel and Buffalo Bayou, Texas.
6. Removing the water hyacinths from Texas waters.
7. Operating and care of Morgans Canal, Texas.
8. West Galveston Bay, Texas, and the mouths of the adjacent streams, including Trinity River, Anahuac channel, Cedar Bayou, Chocolate Bayou, and Bastrop Bayou.
9. Inland waterway—West Galveston Bay and Brazos River Canal channel from Aransas Pass to Pass Cavallo, including Guadalupe River; Turtle Cove from Aransas Pass to Corpus Christi.
10. Operating and care of Galveston and Brazos Canal, Texas.
11. Mouth of Brazos River, Texas.
12. Aransas Pass, Texas.
13. Harbor at Brazos Santiago, Texas.
14. Construction of sea wall, etc., along the front of the Fort Crockett Reservation and from Thirty-ninth to Forty-fifth streets, Galveston, Texas.
15. Removing sunken vessel or craft obstructing or endangering navigation.
16. Operation of dredges.

UNITED STATES ENGINEER OFFICE,
Galveston, Tex., July 17, 1908.

SIR: I have the honor to forward herewith annual reports for the works of river and harbor improvements in my charge for the fiscal year ending June 30, 1908.

Very respectfully,

JOHN C. OAKES,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

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U 1.

IMPROVEMENT OF GALVESTON HARBOR, TEXAS.

OPERATIONS DURING THE YEAR.

JETTIES.

A contract was entered into with Charles Clarke & Co., of Galveston, Tex., for the extension of the south jetty and repairs to the north jetty; work was begun November 23, 1907, and is to be complete March 21, 1909.

Contracts for material for repairs by hired labor to south jetty were entered into with: I. Heffron & Co., for riprap; W. G. Tabb for sand, and Thomas H. Phillips, for cement.

South jetty, extension.—The contractor has delivered and placed between station 348 and station 356, 23,398.03 tons riprap, at $3.6 per ton, amounting to $85,168.84, completing about 25 per cent of the proposed extension.

South jetty, repairs.—Repairs by hired labor between stations 14 and 200 consisted of filling breaks in jetty with riprap and covering with a capping of concrete, 2,734 tons riprap, of which about 32 tons were stone displaced during the storm of September, 1900, were used in filling gaps, and 1,553 cubic yards of concrete were placed for crest protection, at a total cost of $46,994.13.

This work is about 98 per cent completed.

With the money now available it is proposed to complete the repairs and extend the jetty 900 feet.

North jetty.—137.33 tons riprap at $3.64 per ton and 3,069.65 tons at $3.09 per ton, amounting to $9,885, have been delivered and placed in gaps in jetty between stations 101 and 150, making repairs to jetty about 30 per cent completed.

New dredge.—A contract was entered into with the Maryland Steel Company for the construction of a seagoing dredge, at a cost of $357,500. At the end of the fiscal year this dredge was 52 per cent completed.

OPERATIONS BY THE U. S. DREDGE "GEN. C. B. COMSTOCK."

The dredge worked from July 1, 1907, to October 19, 1907, when, owing to an explosion of one of its boilers, it was laid up awaiting the arrival and installation of new boilers; the deck house over the boilers was removed and rebuilt, the machinery was given a thorough overhauling, and all worn-out parts replaced, including pumps and boilers.

On June 10, 1908, the dredge was sent to New Orleans and docked, the bottom cleaned and repairs made to the hull which were necessary; dredge returned to Galveston June 28, 1908, and will be ready to resume work on the outer bar July 6, 1908.

During the fiscal year the dredge excavated and dumped 492,532 cubic yards of material from the outer and inner bars, at an operating cost of 4.75 cents per cubic yard. A consolidated report of the opera-

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tions of the dredge for the entire year will be found in Appendix 16 of this report.

With the money now available it is intended to complete and operate the larger seagoing dredge, which is now being built by contract, and operate the dredge *Comstock* until replaced by the new one. A résumé of the work of this dredge since her construction will be found in Appendix 16 of this report.

SURVEYS.

Map of the latest survey is submitted herewith.

Money statement.

July 1, 1907, balance unexpended		$329,682.24
Amount appropriated by sundry civil act approved May 27, 1908		630,000.00
Proceeds of sales of charts of Galveston Bay		23.45
Proceeds of sales of contact prints		.40
Total		959,706.09
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$177,841.03	
For maintenance of improvement	63,057.31	
		240,898.34
July 1, 1908, balance unexpended		718,807.75
July 1, 1908, outstanding liabilities		44,528.46
July 1, 1908, balance available		674,279.29
July 1, 1908, amount covered by uncompleted contracts		272,905.94
Amount (estimated) required for completion of existing project		70,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$1,000,000.00	
For maintenance of improvement	200,000.00	
		1,200,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

July 11, 1870	$25,000	January 25, 1895	$200,000
March 3, 1871	20,000	March 2, 1895	1,160,000
June 10, 1872	31,000	February 26, 1896	300,000
June 23, 1874	60,000	June 3, 1896	50,000
March 3, 1875	150,000	June 11, 1896	840,000
August 14, 1876	142,000	June 4, 1897	500,000
June 7, 1878	75,000	March 3, 1899	50,000
June 18, 1878	50,000	June 13, 1902	350,000
March 3, 1879	100,000	March 3, 1903	300,000
June 14, 1880	175,000	April 28, 1904	100,000
March 3, 1881	250,000	March 3, 1905	200,000
March 4, 1882	100,000	June 30, 1906	250,000
August 2, 1882	300,000	March 2, 1907	300,000
August 5, 1886	300,000	May 27, 1908	630,000
August 11, 1888	500,000		
September 19, 1890	500,000	Total	10,658,000
March 3, 1891	600,000	Transferred to Galveston channel	50,000
August 5, 1892	450,000		
March 3, 1893	1,000,000		
August 18, 1894	600,000		10,608,000

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In addition to the above appropriations by Congress, th ing additional amounts have been received:

Collected from steamer *Maratime*	$300.00	Receipts from sales of charts of Galveston Bay	
Collected from Quartermaster's Department, U. S. Army	719.83	Receipts from sales of contact prints	
Proceeds of sales of condemned property	1,584.55	Total	10,66
Transfer of tug *Anna*	10,000.00		
Refundment of overpayments	15.36		

CONTRACTS IN FORCE.

Contractor: Charles Clarke & Co., Galveston, Tex.
Amount and character of work: Repairing and extending jetties; 84,0 riprap for south jetty, and 20,000 tons riprap for north jetty.
Rate: Riprap in place for extension of Galveston south jetty, $3.64 p Riprap for repairing alongside of Galveston north jetty, at $3.09 per ton.
Date of approval: September 20, 1907.
Date of beginning work: November 23, 1907.
Date of expiration: March 24, 1909.

Contractor: Thos. H. Phillips, Galveston, Tex.
Amount and character of work: Furnishing and delivering 4,200 b cement.
Rate: $2.20 per barrel "Lehigh" American Portland, in sacks, f. o. b Ninth street and Avenue A, Galveston, Tex. Seven and one-half cents a for all sacks returned in good condition.
Date of approval: August 27, 1907.
Date of beginning work: None. Subject to order.
Date of expiration: October 1, 1908.

[Emergency contract.]

Contractor: W. G. Tabb, Galveston, Tex.
Amount and character of work: Furnishing and delivering 2,200 cubic ya sharp sand.
Rate: $1.75 per cubic yard f. o. b. cars Ninth street and Avenue A, Galvest Tex.
Date of approval: None. Emergency contract.
Date of beginning work: None. Subject to order.
Date of expiration: October 1, 1908.

Contractor: Isaac Heffron, Galveston, Tex.
Amount and character of work: Furnishing and delivering 4,400 cubic yards broken stone and 1,000 tons riprap.
Rate: Broken stone, $2.20 per cubic yard; riprap, $1.55 per ton f. o. b. cars, Ninth street and Avenue A, Galveston, Tex.
Date of approval: September 20, 1907.
Date of beginning work: None. Subject to order.
Date of expiration: None. In effect until all material is delivered.

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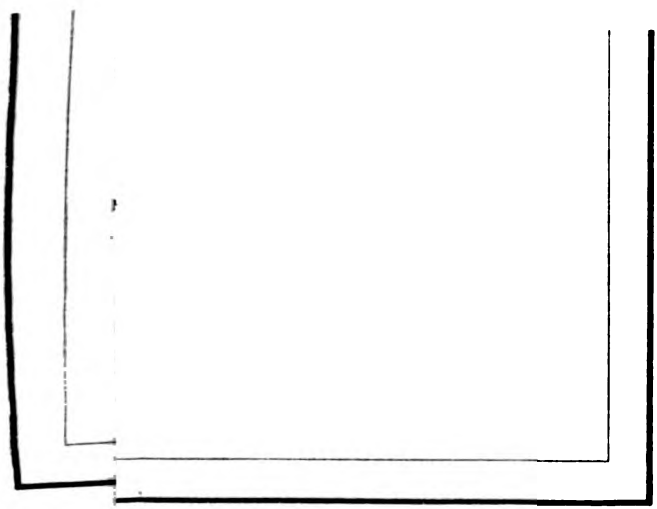

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COMMERCIAL STATISTICS.

All the commerce of Galveston channel, Texas City channel, and Galveston ship channel and Buffalo Bayou which comes in from or goes out to the Gulf, whether coastwise or foreign, passes through the jetty channel. For statistics see pages 1513, 1515, and 1520.

U 2.

IMPROVEMENT OF GALVESTON CHANNEL, TEXAS.

OPERATIONS DURING THE YEAR.

At the beginning of the fiscal year the channel was from 27 to 30 feet deep between Red Beacon and Twenty-ninth street and 700 feet wide; between Twenty-ninth and Forty-fourth streets it was 550 feet wide.

At the end of the year the channel had been widened to 700 feet throughout its length. On the north side it has shoaled in a number of places to 27 feet. Near the east end of the dike on the north side of the channel an approach to a proposed immigrant landing station has been dredged the full width of the channel, 1,400 feet.

A total of 2,018,309 cubic yards of material was removed by United States dredges in widening the channel, providing an approach to the proposed immigrant landing station, and for reenforcing the bulkhead on Pelican flats between Forty-second and Forty-fourth streets.

The U. S. dredge *Col. A. M. Miller* removed 1,632,387 cubic yards of material, at an operating cost of 4.62 cents per cubic yard and a total cost of 6.22 cents per cubic yard, and the U. S. dredge *Gen. H. M. Robert* removed 385,922 cubic yards, at an operating cost of 6.16 cents per cubic yard and a total cost of 8.94 cents per cubic yard.

In addition to work done by the Government, the Galveston Wharf Company removed 24,895 cubic yards of material from a strip 75 feet wide in front of their wharves.

A consolidated report of the operations of the dredges *Col. A. M. Miller* and *Gen. H. M. Robert* for the entire year will be found in Appendix 16 of this report.

The record of fill and scour is as follows:

	Cubic yards.
Fill in channel this year	386,400
Scour in channel this year	260,900
Net fill in channel this year	125,500
Total fill as per last report	1,278,900
Total fill to date	1,404,400

The shoaling and scouring of the channel was very evenly distributed, no part showing any tendency to shoal or scour abnormally.

SURVEYS.

Map of latest survey is submitted herewith.

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Money statement.

July 1, 1907, balance unexpended	
Proceeds of sales of contact prints	
June 30, 1908, amount expended during fiscal year for works of improvement	
July 1, 1908, balance unexpended	
July 1, 1908, outstanding liabilities	
July 1, 1908, balance available	
Amount (estimated) required for completion of existing project	1,
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$150,000.00
For maintenance of improvement	50,000.00
	2

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 13, 1902	$100
March 3, 1903	200
April 28, 1904, allotted	
March 3, 1905	175
Amount diverted from Galveston Harbor	50
March 2, 1907	200,
Total	745,

In addition to the above appropriations by Congress the follo additional amounts have been received:

Proceeds of sale of condemned property	
Refundment of overpayment	
Receipts from sales of contact prints	
Rental of dredge *Miller*	1
Total	745, 17

[a] The balance unexpended July 1, 1907, $195,521.77, as shown by report fiscal year ending June 30, 1907, is in error. The correct balance unexpe was $195,499.89. This discrepancy was due to error in taking up $21.88 ceived from proceeds of sales of condemned property which did not pertai this work.

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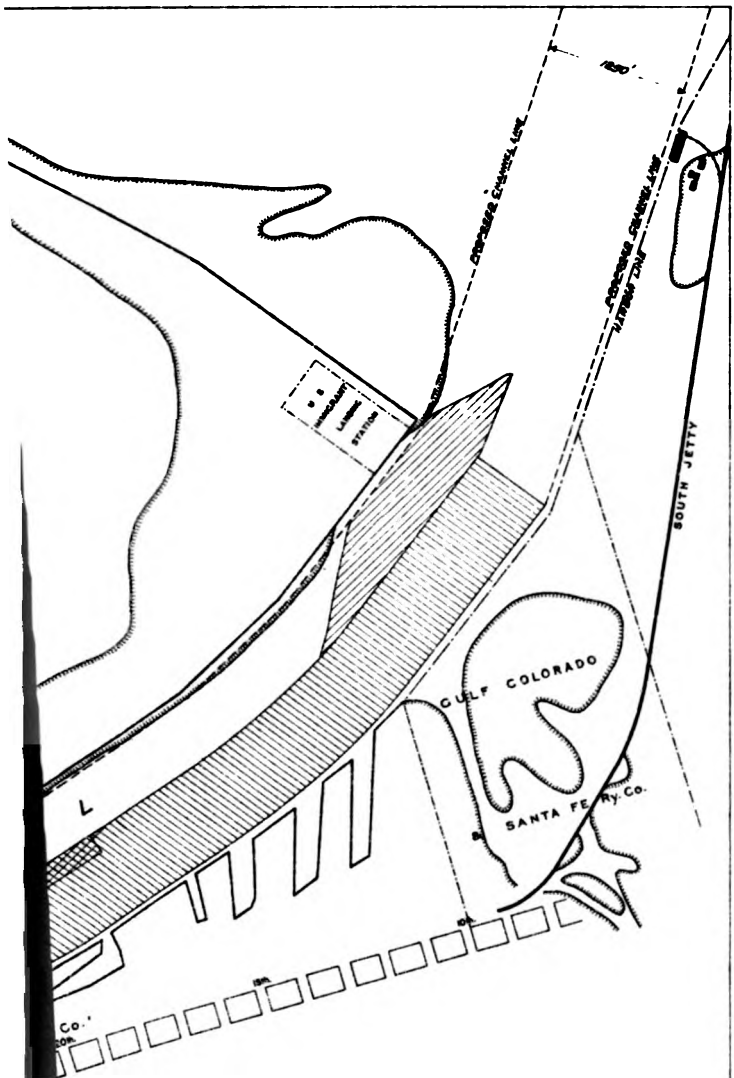

To accompany my report for fiscal year ending June 30th. 1908

John C Oakes

Captain, Corps of Engrs. U.S. Army

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COMMERCIAL STATISTICS.

Domestic exports.

[Calendar year ended December 31, 1907.]

Commodity.	Unit.	Quantity.	Value.
Cotton	Bales	3,500,670	$199,076,379
Cattle	Number	13,570	273,672
Hogs	do	16,387	215,142
Horses	do	409	20,915
Mules	do	302	44,740
Corn	Bushels	5,693,302	2,846,842
Wheat	do	14,172,021	10,904,415
Flour (wheat)	Barrels	361,820	1,384,440
Cotton-seed cake meal	Pounds	759,322,744	10,159,702
Oil (illuminating)	Gallons	10,209,520	619,668
Beef (canned)	Pounds	423,129	44,043
Tallow	do	6,566,358	386,570
Rice	do	471,008	7,881
Timber (sawed)	M feet	31,700	717,788
Timber (hewn)	Cubic feet	77,338	21,885
Logs			319,252
Boards, deals, and planks	M feet	61,377	1,635,191
Staves	Number	6,249,852	688,871
Oil (cotton seed)	Gallons	4,318,205	1,642,558
Oil (crude mineral)	do	20,095,870	988,891
All unenumerated articles			4,348,937
Total values exported			236,277,727

Foreign imports.

Commodity.	Tons.	Value.
General merchandise	39,088	
Coal	322	
Cement	26,344	
Manufactures of iron and steel	8,369	
Lumber and manufactures of wood	1,932	
Ore	692	
Ixtle and sisal	1,433	
Total	78,180	$7,621,761

The tonnage is estimated, but the value is correct and furnished by the custom officials.

Partial statistics of coastwise trade as furnished by the secretary of the Galveston Chamber of Commerce.

Commodity.	Tons.	Commodity.	Tons.
OUTBOUND.		INBOUND.	
Cotton (563,522 bales)	152,322	Coal	65,546
Ore	43,590	Merchandise	456,167
Wool	15,284	Total inbound	521,713
General merchandise	17,023	Grand total	[a]834,402
Grain	32,247		
Flour	5,884		
Copper bullion	8,560		
Ixtle and zacatan	8,177		
Packing-house products	2,089		
Miscellaneous	27,676		
Total outbound	312,689		

[a] Valued at $203,768,556.

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U 3.

IMPROVEMENT OF CHANNEL FROM GALVESTON HARBOR TO TEXAS CITY, TEXAS.

OPERATIONS DURING THE YEAR.

This channel was dredged by the United States May 25, 1905, to 25 feet or greater.

To March 14, 1906, the channel filled 984,300 cubic yards. Between February 1 and May 28, 1906, the dredge *Texas City*, in the employ of the Texas City Transport Company, removed 698,222 cubic yards of material, restoring channel to full width of 100 feet on the bottom and 23 to 25 feet deep, and widening same at the inshore bends between stations 1 and 4.

From May 28, 1906, to June 18, 1907, the channel filled 353,400 cubic yards, the greater amount having taken place between the Texas City wharves and Half Moon channel opening, a distance of 13,100 feet.

Under a contract entered into with John Jacobson, of Texas City, Tex., work of redredging the channel was started July 8, 1907.

A total of 1,001,147 cubic yards of material were removed between Texas City wharves to and across Half Moon channel, a distance of 17,590 linear feet, at a cost of $1.74 per linear foot. A depth of not less than 23 feet and 100 feet wide at bottom was obtained.

Contract completed September 19, 1907.

Money statement.

July 1, 1907, balance unexpended	$59,841.32
Sale of contact prints	.20
	59,841.52
June 30, 1908, amount expended during fiscal year for maintenance of improvement	25,361.01
July 1, 1908, balance unexpended	34,480.51
July 1, 1908, outstanding liabilities	6,121.32
July 1, 1908, balance available	28,359.19
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	50,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

March 3, 1899	$250,000.00
March 2, 1907	60,000.00
Total	310,000.00
Sales of contact prints	.20
Total	310,000.20

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CONTRACT IN FORCE.

[Emergency contract.]

Contractor: John Jacobson, Texas City, Tex.
Character of work: Dredging.
Rate: $1.74 per linear foot.
Date of beginning work: July 20, 1907.
Date of expiration: November 20, 1907. Completed September 19, 1907.

COMMERCIAL STATISTICS.

[For the year ending December 31, 1907.]

Articles.	Tons.	Approximate value.
EXPORTS.		
Grain	12,374	$275,604
Lumber	16,076	238,196
General merchandise	1,837	211,145
Manufactures of iron and steel	689	49,157
Cattle and other animals	1,540	189,312
Total exports	32,516	963,416
IMPORTS.		
Sisal	24,843	$3,328,007
Coffee	637	145,192
General merchandise	249	29,558
Total imports	25,729	$3,502,757
Domestic shipments	19,219	2,401,600
Total	44,948	5,904,357

U 4.

IMPROVEMENT OF CHANNEL TO PORT BOLIVAR, TEXAS.

OPERATIONS DURING THE YEAR.

Contractor John Jacobson, of Texas City, Tex., was awarded a contract on June 20, 1907, and commenced work with dredge *Washington* on October 16, 1907.

Two hundred and forty-seven thousand nine hundred and ninety-eight cubic yards of material were removed, at 9¼ cents per cubic yard, amounting to $22,276.73, from a cut extending from the transfer wharf toward deep water in Bolivar roads, a distance of 2,130 feet. The channel is 150 feet wide at bottom and from 23 to 26 feet deep. The work is about 40 per cent completed.

Work was suspended by contractor December 9, 1907, until weather conditions should improve and provision could be made for retaining spoil behind bulkhead.

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Money statement.

July 1, 1907, balance unexpended	$
June 30, 1908, amount expended during fiscal year for works of improvement	
July 1, 1908, balance unexpended	
July 1, 1908, outstanding liabilities	
July 1, 1908, balance available	
July 1, 1908, amount covered by uncompleted contracts	
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATION.

March 2, 1907

CONTRACT IN FORCE.

[Emergency contract.]

Contractor: John Jacobson, Texas City, Tex.
Character of work: Dredging.
Rate: 9¼ cents per cubic yard.
Date of beginning work: July 20, 1907.
Date of expiration: January 20, 1908. Time limit waived.

U 5.

IMPROVEMENT OF GALVESTON SHIP CHANNEL AND BU BAYOU, TEXAS.

OPERATIONS DURING THE YEAR.

Dredging operations were carried on during the fiscal ye contract with August Nelson, of New York, N. Y., by th dredges *Col. A. M. Miller* and *Gen. H. M. Robert* and th dredge *Thos. H. Ball*, belonging to the city of Houston, l and operated by the United States.

A total of 1,950,241 cubic yards of material were excavate the year, of which 548,013 cubic yards were new work and cubic yards maintenance.

Snagging operations were carried on by the U. S. derri *No. 1.* There were removed from the bayou 101 trees stumps and snags.

The work performed in the different sections was as follow

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DIVISION ONE (LOWER BAY).

Since dredging channel to 18½-foot depth in 1904 this section had filled 2,640,600 cubic yards to January 19, 1908.

The U. S. dredge *Col. A. M. Miller* worked from January 19, 1908, to March 28, 1908, redredging a channel 36,705 feet long, 150 feet wide on the bottom, and from 14 to 16 feet deep between stations 59+026 and 22+321.

One million three hundred and fourteen thousand and seventy-four cubic yards of material were removed, at an operating cost of 1.82 cents per cubic yard and a total cost of 2.82 cents per cubic yard, giving a channel depth from Bolivar roads to Red Fish bar of 16 feet.

UPPER BAY.

No work was done during the year. From June, 1907, to April, 1908, the channel filled to the extent of about 188,850 cubic yards, making the total fill in this section 2,735,850 cubic yards since the channel was dredged in 1904.

For operating and care of Morgan Canal, which is a part of this division, see page 1521 of this report.

DIVISION TWO (BAYOU).

In this division operations consisted of new work and maintenance performed by the U. S. dredge *Gen. H. M. Robert.* Between April 17, 1908, and June 30, 1908, 152,555 cubic yards of new material were removed between stations 60+220 and 61+800, at an operating cost of 10.35 cents per cubic yard and a total cost of 18.23 cents per cubic yard, and in maintaining the channel 55,865 cubic yards of material were removed between stations 112+777 and 109+627, at an operating cost of 9.60 cents per cubic yard and a total cost of 9.84 cents per cubic yard.

This material was pumped over the banks of the bayou to settling basins to heights between 9 and 35 feet.

From June 5 to June 21, 1908, U. S. derrick barge *No. 1* removed 82 trees and 47 snags and stumps from the bayou between miles 20¾ and 23, at a cost of $563.57.

A consolidated report of the operations of the dredges for the entire year will be found in Appendix 16 of this report.

Between April, 1907, and April, 1908, this division silted 281,318 cubic yards and scoured 141,568 cubic yards.

	Cubic yards.
Total fill this year	281,318
Total scour this year	141,568
Net fill this year	139,750
Total fill last report	662,000
Total fill since dredging	801,750

Satisfactory deeds for right of way have been secured from 64 property owners, about 74 per cent of bayou frontage of this division, or 32⅜ miles out of a possible 43½ required.

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DIVISION THREE (BAYOU AND TURNING BASIN).

Dredging operations were resumed December 14, 1907, by the contractor, August Nelson, of New York, N. Y., and continued until the end of the fiscal year. Three hundred and thirty thousand five hundred and seventy-nine cubic yards of new material from the prescribed cross section at 19.9 cents per cubic yard, and 21,121 cubic yards from 1 foot below the prescribed cross section at 9.95 cents per cubic yard, have been removed at a total cost of $67,886.76; in maintaining channel 32,289 cubic yards were removed at 19.9 cents per cubic yard, amounting to $6,425.51; 28,000 cubic yards of material from the Houston Division were rehandled at a cost of $5,572. This amount was paid from funds appropriated for the Houston Division and is accounted for in the statement for that division; all between stations 130+000 and 133+450, including turning basin. The excavated channel is 100 feet wide on the bottom and 18½ feet deep; turning basin 600 feet wide on bottom.

From June, 1907, to April, 1908, the channel silted to the extent of 105,240 cubic yards. The total silting in this division since dredging amounts to 310,914 cubic yards, of which 83,417 cubic yards have been removed.

HOUSTON DIVISION (TURNING BASIN TO MAIN STREET, HOUSTON).

The dipper dredge *Thos. H. Ball*, belonging to the city of Houston, was loaned to and operated by the United States with hired labor from January 1, 1908, to May 27, 1908. All shoals were dredged between the turning basin and the foot of Main street, Houston, leaving a channel 8 feet deep and 40 feet wide.

A total of 43,758 cubic yards of material were removed, at an operating cost of 45.67 cents per cubic yard, and a total cost of 71.19 cents per cubic yard. The latter figure includes the cost of constructing three dump scows for $9,950 and also 19.9 cents per yard for redredging by contractor. The dredged material was towed in dump scows to the turning basin and dumped, thence it was redredged by the contractor's dredge *Washington* and pumped over the banks. This method of double handling was necessary, as dumping privileges could not be secured on the banks above the turning basin.

A derrick barge was constructed for snagging on all divisions of this channel at a cost of $8,798.43. It worked on this division fifteen days in June, 1908, removing 19 trees and 60 snags and stumps from between miles 25¼ and 26¾, at a cost of $506.43.

A consolidated statement of the operation of the dredge *Thos. H. Ball* and United States derrick barge will be found in Appendix 16 of this report.

REMARKS.

To obtain any uniform depth a number of dredges will have to be operated on different sections at the same time, and a sufficient sum for maintenance must be available when the uniform depth is obtained.

To obtain the uniform depth of 18½ feet, toward which we are now working, will require the rapid excavation by several dredges of 5,500,000 yards of fill at an estimated cost of $330,000, and a yearly expenditure of $150,000 for maintenance. To obtain within reason-

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able time a uniform depth of 25 feet will require a lump-sum appropriation of approximately $2,000,000 and a yearly maintenance fund of approximately $300,000.

Money statement.

July 1, 1907, balance unexpended		$307,806.41
Amount appropriated by sundry civil act approved May 27, 1908		145,000.00
Proceeds of sales of contact prints		4.07
		452,810.48
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$138,529.28	
For maintenance of improvement	53,883.05	
		192,412.33
July 1, 1908, balance unexpended		260,398.15
July 1, 1908, outstanding liabilities		45,852.20
July 1, 1908, balance available		214,545.95
July 1, 1908, amount covered by uncompleted contracts		15,103.16
Amount (estimated) required for completion of existing project		2,855,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$330,000.00	
For maintenance of improvement	150,000.00	
		480,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

GALVESTON SHIP CHANNEL AND BUFFALO BAYOU.

March 3, 1899	$300,000.00
June 13, 1902	300,000.00
March 3, 1903	500,000.00
April 28, 1904	200,000.00
March 3, 1905	200,000.00
June 30, 1906	200,000.00
March 2, 1907	200,000.00
May 27, 1908	145,000.00
Total	2,045,000.00

In addition to the above appropriations by Congress the following additional amounts have been received:

Proceeds of sales of condemned property	1.04
Refundment office of Chief of Engineers	40.11
Refundment of overpayments	.74
Receipts from sales of contact prints	11.72
Total	2,045,053.61

SHIP CHANNEL IN GALVESTON BAY, TEXAS.

June 10, 1872	$10,000.00
June 23, 1874	10,000.00
March 3, 1875	35,200.00
August 14, 1876	72,000.00
June 18, 1878	75,000.00
March 3, 1879	80,000.00
June 14, 1880	50,000.00
March 3, 1881	50,000.00
August 2, 1882	94,500.00
August 11, 1888	100,000.00

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September 19, 1890	$132,316.85
July 13, 1892	40,000.00
August 18, 1894	50,000.00
June 8, 1896	50,000.00
Total	849,016.85

BUFFALO BAYOU, TEXAS.

March 3, 1881	$25,000.00
August 2, 1882	50,000.00
July 2, 1884	25,000.00
August 5, 1886	18,750.00
August 11, 1888	25,000.00
September 19, 1890	25,000.00
July 13, 1892	25,000.00
August 18, 1894	15,000.00
June 8, 1896	20,000.00
Total	228,750.00

CONTRACTS IN FORCE.

[Emergency contract.]

Contractor: Kingsford Foundry and Machine Works, Oswego, N. Y.
Character of work: Four Scotch marine boilers.
Rate: $8,600 for four.
Date of approval: None. Emergency contract.
Date of beginning work: None.
Date of expiration: April 1, 1908.

Contractor: August Nelson, New York, N. Y.
Character of work: Dredging—1,250,000 cubic yards.
Rate: 19.9 cents per cubic yard.
Date of approval: April 21, 1906.
Date of beginning work: May 25, 1906.
Date of expiration: December 25, 1907. Time limit waived.

COMMERCIAL STATISTICS.

[Furnished by the secretary of the Houston Cotton Exchange and Board of Trade.]

	Tons.	Value.
Cotton ($53,589 bales)	92,849	$19,331,715
Spikes	309	14,214
Rope	466	7,922
Oil	10,905	294,451
Slate	127	2,209
Rails	574	14,275
Railroad material	64	2,560
Bagging	20	2,000
Soap	556	4,445
Paper	95	7,110
Stearin	94	1,692
Coal	2,958	56,396
Rice	22,712	908,535
Lumber and shingles	60,560	719,250
Sand	164,540	164,540
Shell	39,875	59,812
Cord wood	8,950	44,750
Brick	7,892	39,460
Hardware and machinery	8,285	823,500
Grain and feed	10,120	202,600
Groceries and provisions	7,920	396,000
Beer and ice	2,700	189,000
Oysters and fish	1,410	42,300
Furniture and pianos	807	807,000
Hay	390	3,900
Miscellaneous	325	325,000
Total	452,463	24,466,730

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These figures were furnished by the wharf master for shipments handled at the foot of Main street; the Direct Navigation Company for business handled by that line; the T. and N. O. R. R. Company for business handled at Clinton; the I. and G. N. R. R. Company for business handled at Long reach by that company; the C. R. Cummings Lumber Company for business handled by them, and the G. H. and H. Transportation Company for business handled by their barges. This tonnage was carried wholly by barges and small sail or power boats.

U 6.

REMOVING THE WATER HYACINTHS FROM TEXAS WATERS.

On August 9, 1907, water hyacinths were first noticed in Buffalo Bayou, Texas, on log rafts in vicinity of C. R. Cummings's sawmill, Mile 27; later, on September 27, 1907, several patches were seen floating in small bayous and in the Marshes at Mile 6; and on October 13, 1907, the old channel around Harrisburg Bend was found to be thickly dotted with large patches floating in stream and many bunches growing on the banks on each side of the bayou, while the mouth of Brays Bayou up to the sawmills was nearly blocked.

An allotment of $500 was made on November 4, 1907, to destroy the hyacinths and prevent their becoming an obstruction to navigation. As they were scattered in small bunches, it was deemed impracticable to spray with arsenic and soda solution, so men were employed to gather them up in boats and place them on high ground, where they dried up and died. Two men with boats and launch have been employed by the city of Houston, Tex., since February 1, 1908, on this work and have practically cleared the bayou except for a few scattered bunches in marshes and high grass below Lynchburg, Tex. This work has been supervised by the United States Engineer Department, at a cost of $35.26.

Efforts are being made to drain a small marsh pond in order to destroy about 6 acres of the hyacinths at Mile 15¾.

Money statement.

November 4, 1907, amount allotted	$500.00
June 30, 1908, amount expended during fiscal year, for works of improvement	25.27
July 1, 1908, balance unexpended	474.73
July 1, 1908, outstanding liabilities	9.99
July 1, 1908, balance available	464.74

U 7.

OPERATING AND CARE OF MORGAN CANAL, TEXAS.

A custodian was stationed at the canal during the year to enforce the regulations governing the navigation of the canal and to care for United States property.

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Condition of canal.—The wooden bulkheads are gradually deteriorating.

For improvement of waterway of which this canal is a part, see page 1517 of this report.

The amount expended during the fiscal year was as follows:

Custodian	$360

ABSTRACT OF ALLOTMENTS.

December 2, 1896	$240	July 8, 1904	$360
July 16, 1897	360	June 23, 1905	360
July 1, 1898	360	June 16, 1906	360
July 1, 1899	360	June 14, 1907	360
July 14, 1900	360	June 11, 1908	360
June 11, 1901	5,000		
July 18, 1902	360	Total	9,200
June 24, 1903	360		

COMMERCIAL STATISTICS.

Number of vessels passing up and down through Morgan Canal during calendar year ending December 31, 1907, as reported by the custodian at the canal.

	Number.
Vessels engaged in carrying freight	1,315
Vessels in the employ of the United States or its contractors	106
Total	1,421

U 8.

IMPROVEMENT OF WEST GALVESTON BAY CHANNEL, TEXAS, AND THE MOUTHS OF ADJACENT STREAMS, INCLUDING TRINITY RIVER, ANAHUAC CHANNEL, CEDAR BAYOU, CHOCOLATE BAYOU, AND BASTROP BAYOU.

(A) CHANNEL ACROSS HANNA REEF (EAST BAY BAYOU).

OPERATIONS DURING THE YEAR.

No work performed during the year.

APPROPRIATION.

June 13, 1902 (allotted)	$681.91

(B) DOUBLE BAYOU.

OPERATIONS DURING THE YEAR.

The U. S. dredge *Gen. H. M. Robert* commenced dredging in Double Bayou channel September 9, 1907, and completed September 20, 1907.

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The channel is about 6,000 feet long, 80 feet wide, and 7 feet deep, and was dredged from the 6-foot contour in Galveston Bay across the bar into Double Bayou.

A total of 54,994 cubic yards of material were removed, at an operating cost of 6.27 cents and total cost of 6.37 cents per cubic yard. The latter figure includes proportionate amount of $36,140.58 expended in converting the *Howell* into a 12-inch suction dredge.

Money statement.

July 1, 1907, balance unexpended	$8,999.45
Transferred to Clear Creek, Texas	403.50
	3,595.95
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,595.95

APPROPRIATIONS.

June 13, 1902 (allotted)	$6,952.65
March 2, 1907 (allotted)	3,596.50
Total	10,549.15

COMMERCIAL STATISTICS.

During the calendar year 1907, 3,600 tons rice, valued at $150,000, and produce valued at $15,000 were taken out and merchandise valued at $90,000 was sent up the bayou.

(c) ANAHUAC CHANNEL.

OPERATIONS DURING THE YEAR.

The U. S. dredge *Gen. H. M. Robert* commenced work on Anahuac channel August 10, 1907, and completed channel September 4, 1907. A channel 15,110 feet long, 80 feet wide, and 7 feet deep was redredged from the 6-foot contour in Galveston Bay to wharf at Anahuac, thence to Browns Pass, mouth of Trinity River. A total of 162,028 cubic yards of material were removed, at a total cost of 3.78 cents per cubic yard.

Money statement.

July 1, 1907, balance unexpended	$6,124.99
June 30, 1908, amount expended during the fiscal year, for maintenance of improvement	6,124.99

APPROPRIATIONS.

March 3, 1905 (allotted)	$6,100
March 2, 1907 (allotted)	6,000
Total	12,100

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COMMERCIAL STATISTICS.

During the calendar year 1907 5,400 tons of rice, valued at $225,000 chandise valued at $110,000 were shipped to and from Anahuac. The from the mouth of the Trinity River and Turtle Bayou is carried th Anahuac channel.

(D) MOUTH OF TRINITY RIVER.

OPERATIONS DURING THE YEAR.

The U. S. dredge *Gen. H. M. Robert* commenced dre Browns Pass, one of the mouths of Trinity River, Septembe and completed September 7, 1907.

A channel 80 feet wide and 7 feet deep was redredged fron the outer end of wharf at Anahuac into and through Brown 7 feet in main river. A total of 23,989 cubic yards of mate removed, at a total cost of 3.57 cents per cubic yard.

Money statement.

July 1, 1907, balance unexpended
Transferred to Clear Creek, Texas

June 30, 1908, amount expended during fiscal year, for maintenance of improvement

---

APPROPRIATIONS.

August 30, 1852	$3,000.00	June 3, 1896	
June 18, 1878	10,000.00	June 13, 1902 (allotted)	
March 3, 1879	2,500.00	March 3, 1905 (allotted)	
June 14, 1880	4,000.00	March 2, 1907 (allotted)	
March 3, 1881	10,000.00		
August 2, 1882	8,000.00		
August 11, 1888	12,500.00	Sale of condemned property	
September 19, 1890	10,000.00		
July 13, 1892	10,000.00		
August 18, 1894	5,000.00	Total	

COMMERCIAL STATISTICS.

During the calendar year 1907 the following articles were through Browns Pass at mouth of Trinity River:

Articles.		Amount
Rice	tons	18,572
Lumber	do	30,392
General merchandise	do	7,250
Cotton	do	31
Cotton seed (received)	do	20
Charcoal	do	465
Wood	do	4,400
Hogs	head	1,000
Fuel oil	barrels	50,000
Total		

Six tugboats, 18 barges, and 20 schooners, 17 of which are equi gasoline engines, are engaged in carrying the commerce of Anahuac ch mouth of Trinity River.

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(E) CEDAR BAYOU.

OPERATIONS DURING THE YEAR.

The U. S. dredge *Gen. H. M. Robert* commenced dredging in Cedar Bayou channel September 21, 1907, and completed October 15, 1907.

A channel about 11,000 feet long, 80 feet wide, and 7 feet deep, was redredged from deep water in San Jacinto Bay through Cloppers bar to and inside the jetties at the entrance to Cedar Bayou. Ninety-eight thousand nine hundred and seventy-four cubic yards of material were removed, at a total cost of 4.69 cents per cubic yard.

The U. S. snag boat *Capt. C. W. Howell*, equipped with clamshell bucket, worked from August 28, 1907, to August 31, 1907, redredging a channel 390 feet long, 40 feet wide, and 5 feet deep through the opening left in the Galveston Ship channel dike known as Cedar Bayou Gap. One thousand seven hundred and thirty-four cubic yards of material were removed from the cut. This opening was left and is mantained for the use of small boats going up and down the bay from Cedar Bayou and other places in the vicinity.

Money statement.

July 1, 1907, balance unexpended	$5,153.85
Transferred to Clear Creek, Texas	214.48
	4,939.37
June 30, 1908, amount expended during fiscal year for maintenance of improvement	4,939.37

APPROPRIATIONS.

September 19, 1890	$18,150.00	March 2, 1907 (allotted)	$4,785.52
July 13, 1892	14,000.00		
June 13, 1902	5,000.00	Total	44,085.52
March 3, 1905 (allotted)	2,100.00		

COMMERCIAL STATISTICS.

During the calendar year 1907, 1,200,000 brick, valued at $9,800, were carried over the bayou by one boat. General merchandise for the use of the locality, and the produce raised, are shipped on the bayou, but it has been impossible to obtain statistics as to quantity and value.

(F) CLEAR CREEK.

OPERATIONS DURING THE YEAR.

The U. S. dredge *Capt. C. W. Howell* commenced dredging in Clear Creek December 11, 1907, and completed February 4, 1908.

A channel about 22,847 feet long, 40 feet wide, and from 4 to 6 feet deep has been excavated across the lake to deep water in the creek.

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A total of 80,083 cubic yards of material were removed at an operating cost of 11.93 cents per cubic yard and total cost of 13.10 cents per cubic yard. The latter figure includes a proportionate amount of $36,140.58 expended in converting the *Howell* into a 12-inch suction dredge.

There has also been removed at an expense of about $2,500 approximately 41,000 cubic yards of material by the firm of Suderman & Dolson under contract with private parties. Under this contract a channel is to be dredged about 4,700 feet long, 80 feet wide, and 6 feet deep from the 6-foot contour in Galveston Bay to deep water in the creek, following the line of the old channel across the bar.

At the close of the fiscal year this private work is reported as being about 90 per cent completed.

Money statement.

July 1, 1907, balance unexpended	$7,999.70
Transferred from other works	2,539.73
	10,539.43
June 30, 1908, amount expended during fiscal year for works of improvement	10,487.56
July 1, 1908, balance unexpended	51.87

APPROPRIATIONS.

June 13, 1902 (allotted)	$2.30
March 2, 1907 (allotted)	10,539.73
Total	10,542.03

COMMERCIAL STATISTICS.

During the calendar year 1907, 250 tons of merchandise and produce were taken to and from Friendswood, Tex., over this creek.

(G) DICKINSON BAYOU.

OPERATIONS DURING THE YEAR.

The U. S. snag boat *Capt. C. W. Howell*, with a clam-shell bucket, started dredging at entrance to Dickinson Bayou July 17, 1907, and completed August 27, 1907.

A channel 10,625 feet long, 40 feet wide, and 5 feet deep was dredged over a distance of 15,140 feet through the bar obstructing the mouth to the 5-foot depth in the bayou.

A total of 47,811 cubic yards of material were removed at an operating cost of 10.27 cents per cubic yard and a total cost of 13.14 cents per cubic yard. The latter figure includes a proportionate amount of $36,140.58 expended in converting the *Howell* into a 12-inch suction dredge.

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Money statement.

July 1, 1907, balance unexpended	$6,999.70
June 30, 1908, amount expended during fiscal year, for works of improvement	6,282.03
July 1, 1908, balance unexpended	717.67

APPROPRIATION.

March 2, 1907 (allotted)	$7,000

COMMERCIAL STATISTICS.

During the calendar year 1907, 200 tons of produce have been taken out of the bayou. Farmers and truck growers living in the vicinity of the bayou owning schooners and gas launches handle a great deal of freight in and out, but it is difficult to arrive at quantity and value.

(H) BASTROP BAYOU.

OPERATIONS DURING THE YEAR.

At the beginning of the fiscal year the U. S. snag boat *Capt. C. W. Howell*, with a clam-shell bucket, was working on a channel across Bastrop Bay to connect with the bayou. Operations were continued during the year until the completion of the work, July 15, 1907. A channel 3,970 feet long, 40 feet wide, and from 4 to 5 feet deep was excavated to and up the bayou beyond three small shoals obstructing navigation above the mouth.

A total of 16,645 cubic yards of material were removed at an operating cost of 11.31 cents per cubic yard and total cost of 16.06 cents per cubic yard. The latter figure includes a proportionate amount of $36,140.58 expended in converting the *Howell* into a 12-inch suction dredge.

Money statement.

July 1, 1907, balance unexpended	$6,464.86
Transferred to Clear Creek, Texas	79.78
	6,385.08
June 30, 1908, amount expended during fiscal year for works of improvement	6,385.08

APPROPRIATION.

March 2, 1907 (allotted)	$9,920.22

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(I) CHOCOLATE BAYOU.

OPERATIONS DURING THE YEAR.

No work has been performed during the year.

Money statement.

Amount appropriated by river and harbor act approved March 2, 1907_
Transferred to Clear Creek, Texas_____

June 30, 1908, amount expended during fiscal year for works of improvement _____

July 1, 1908, balance unexpended_____

APPROPRIATION.

March 2, 1907 (allotted)_____

DREDGE GEN. H. M. ROBERT.

APPROPRIATIONS.

Act March 3, 1899_____ $
Act June 13, 1902_____

Sales of condemned property_____

Total _____

U 9.

IMPROVEMENT OF INLAND WATERWAY ON COAST OF TE

(A) WEST GALVESTON BAY AND BRAZOS RIVER CANAL.

OPERATIONS DURING THE YEAR.

The U. S. dredge *Capt. C. W. Howell* commenced dredging Galveston Bay and Brazos River Canal February 20, 1908, 38¼, the western end of the canal, and at the end of the fis had redredged and deepened the channel to 6 feet, 40 feet the bottom, for a distance of 33,500 feet.

A total of 165,406 cubic yards of material were remove operating cost of 12.62 cents per cubic yard, and a total cost cents per cubic yard. The latter figure includes a propo amount of $36,140.58 expended in converting the *Howell* fron boat and dredge into a 12-inch suction dredge.

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Money statement.

July 1, 1907, balance unexpended		$44,156.55
Amount appropriated by sundry civil act approved May 27, 1908		92,029.00
Amount transferred from Aransas Pass to Pass Cavallo		14,500.00
Sales of contact prints		1.48
		150,687.03
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$37,494.03	
For maintenance of improvement	20,000.00	
		57,494.03
July 1, 1908, balance unexpended		93,193.00
July 1, 1908, outstanding liabilities		4,664.91
July 1, 1908, balance available		88,428.09
Amount (estimated) required for completion of existing project		20,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$20,000.00	
For maintenance of improvement	20,000.00	
		40,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

Money statement.

July 1, 1907, balance unexpended	$81.90
June 30, 1908, amount expended during fiscal year for works of improvement	81.90

APPROPRIATIONS.

WEST GALVESTON BAY AND BRAZOS RIVER CANAL.

March 2, 1907	$59,500.00
May 27, 1908	92,029.00
Sales of contact prints	1.48
Total	151,530.48

CHANNEL IN WEST GALVESTON BAY.

July 13, 1892	$15,000.00
August 18, 1894	5,000.00
June 3, 1896	5,000.00
March 3, 1905 (allotted)	10,000.00
	35,000.00
Sales of condemned property	58.34
Sales of contact prints	1.35
Total	35,059.69

GALVESTON AND BRAZOS CANAL.

June 13, 1902 (allotted)	$39,307.66
March 3, 1905 (allotted)	28,000.00
	67,307.66
Refundment of overpayment	1.20
Total	67,308.86

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COMMERCIAL STATISTICS.

For commercial statistics, see page 1533 of this report.

(B) CHANNEL FROM ARANSAS PASS TO PASS CAVALLO.

Operations during the year.

A contract was entered into with the Bowers Southern Dredging Company, of Galveston, Tex., September 9, 1907, and work started with dredge *No. 8*, February 6, 1908.

A total of 18,022 cubic yards of material have been excavated to the prescribed cross section at contract price of 18.8 cents per cubic yard, amounting to $3,388.14, and 12,889.5 cubic yards 1 foot below prescribed cross section at 9.4 cents per cubic yard, amounting to $1,211.61.

Work started at mile 42½ (Long reef) and was continued to mile 37¾ (Cape Carlos Dugout), a distance of 4¾ miles. Of this, 10,800 linear feet were actually dredged, the balance being through open bay with more than the required depth of water.

The dredged channel is over 5 feet deep, and averages 45 feet wide, except on curves, where it is 65 feet wide.

Seven permanent beacons have been erected along line of cut at a cost of $445.86.

Money statement.

July 1, 1907, balance unexpended	$39,923.79
Amount transferred to West Galveston Bay and Brazos River Canal	14,500.00
	25,423.79
Amount appropriated by sundry civil act approved May 27, 1908	40,350.00
Sales of contact prints	.95
	65,774.74
June 30, 1908, amount expended during fiscal year, for works of improvement	8,236.16
July 1, 1908, balance unexpended	57,538.58
July 1, 1908, outstanding liabilities	1,339.92
July 1, 1908, balance available	56,198.66
July 1, 1908, amount covered by uncompleted contracts	55,646.06
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	20,000.00

APPROPRIATIONS.

March 2, 1907	$25,500.00
May 27, 1908	40,350.00
Sale of contact prints	.95
Total	65,850.95

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CONTRACT IN FORCE.

Contractor: Bowers Southern Dredging Company, Galveston, Tex.
Amount and character of work: Dredging, 530,000 cubic yards.
Rate: 18⅞ cents per cubic yard measured in place.
Date of approval: September 19, 1907.
Date of beginning work: January 22, 1908.
Date of expiration: April 6, 1909.

(c) GUADALUPE RIVER TO VICTORIA, TEX.

OPERATIONS DURING THE YEAR.

On February 17, 1908, work of building a combined dredge and snag boat by hired labor was started at Victoria, Tex. The hull was launched May 6, 1908. Machinery has been installed and deck house built, at a total cost to date of $33,272.43.

At the close of the fiscal year the boat is practically completed and has begun snagging and dredging operations in the Guadalupe River between Victoria, Tex., and the mouth.

Money statement.

July 1, 1907, balance unexpended		$38,790.79
Amount appropriated by sundry civil act approved May 27, 1908		21,871.00
Refundment by civilian employee		1.00
		60,662.79
June 30, 1908, amount expended during fiscal year, for works of improvement		26,862.82
July 1, 1908, balance unexpended		33,799.97
July 1, 1908, outstanding liabilities		6,409.61
July 1, 1908, balance available		27,390.36
July 1, 1908, amount covered by uncompleted contracts		40,895.00
Amount (estimated) required for completion of existing project		32,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$32,000.00	
For maintenance of improvement	20,000.00	
		52,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

March 2, 1907	$38,829.00
May 27, 1908	21,871.00
Refundment by civilian employee	1.00
Sales of contact prints	.55
Total	60,701.55

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CONTRACT IN FORCE.

[Emergency contract.]

Contractor: Kingsford Foundry and Machine Works, Oswego, N. Y.
Character of work: Two fuel-oil tanks and two fresh-water tanks and [illegible] brass deck screw plates.
Rate: All for $895.
Date of approval: None; emergency contract.
Date of beginning work: None.
Date of expiration: April 1, 1908.

COMMERCIAL STATISTICS.

During the calendar year 1907 the following was transported through the river as far as navigable: 300 bales of cotton, 100,000 feet of lumber, 10,000 posts, 74,000 pounds of wire, 8 cars of corn, and 2 cars of brick and cement.

(D) TURTLE COVE CHANNEL FROM TURTLE COVE TO CORPUS CHRISTI.

OPERATIONS DURING THE YEAR.

No work has been performed.

A contract for dredging this channel was entered into December 23, 1907, with the Bowers Southern Dredging Company, of Galveston, Tex. Operations will commence in July, 1908.

Money statement.

July 1, 1907, balance unexpended	$9,958.29
Amount appropriated by sundry civil act approved May 27, 1908	90,750.00
Sales of contact prints	.40
	100,708.69
June 30, 1908, amount expended during fiscal year, for works of improvement	297.41
July 1, 1908, balance unexpended	100,411.28
July 1, 1908, outstanding liabilities	59.69
July 1, 1908, balance available	100,351.59
July 1, 1908, amount covered by uncompleted contracts	115,500.00
Amount (estimated) required for completion of existing project	23,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	20,000.00

APPROPRIATION.

March 2, 1907	$10,000.00
May 27, 1908	90,750.00
Sales of contact prints	.40
Total	100,750.40

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CONTRACT IN FORCE.

Contractor: Bowers Southern Dredging Company, Galveston, Tex.
Amount and character of work: Dredging 825,000 cubic yards.
Rate: Fourteen cents per cubic yard measured in place.
Date of approval: January 6, 1908.
Date of beginning work: Contractor is permitted to commence work at any time, but not permitted to complete dredging until shore end of Aransas Pass north jetty is advanced enough to prevent a channel from forming between the jetty and St. Joseph Island. United States can require work to be commenced within sixty days after notification to commence.
Date of expiration: Sixteen months after date of notification to commence work.

U 10.

OPERATING AND CARE OF GALVESTON AND BRAZOS CANAL.

OPERATIONS DURING THE YEAR.

A new drawbridge was built by the United States across the canal at a cost of $1,776.55. The bridge was turned over to the county of Brazoria in September, 1907, to be operated and maintained by them in accordance with agreement with the United States.

A watchman was stationed at the canal to operate the temporary ponton bridge and care for the log boom at the entrance to the canal from the Brazos River until the new bridge was taken over by the county. A boom tender is now employed to care for the log boom.

For improvement of the canal, see page 1528 of this report.

Amount expended during the fiscal year was as follows:

Watchman and boom tender	$205.00
Superintendence and labor	900.69
Tools and supplies	870.86
Hauling material	5.00
Total	1,981.55

ALLOTMENTS.

July 19, 1904	$1,030.00
October 30, 1905	759.23
June 16, 1906	420.00
April 23, 1907	1,500.00
June 21, 1907	420.00
Total	4,129.23

COMMERCIAL STATISTICS.

Number of vessels passing up and down the canal from January 1, 1907, to October 1, 1907, as reported by the watchman.

Vessels engaged in carrying freight	214
Vessels in the employ of the United States or its contractors	66
Total	280

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U 11.

IMPROVEMENT OF THE MOUTH OF BRAZOS RIVER, TE

OPERATIONS DURING THE YEAR.

Work of repairing the jetties was resumed under a contra
Charles Clarke & Co., of Galveston, Tex., September 23, 19
pleted January 28, 1908.

A total of 11,255.02 tons of large and small riprap were d
and placed at $3.58 per ton, amounting to $40,292.97. Of thi
tity 9,140.56 tons were distributed over southwest jetty, and
tons over the northeast jetty and the crib dike running o
bank to the entrance of Brazos Canal.

This practically completes repairs to the jetties.

SURVEYS.

A map of the latest survey is submitted herewith.

Money statement.

July 1, 1907, balance unexpended	$60,
June 30, 1908, amount expended during fiscal year for works of improvement	42,
July 1, 1908, balance unexpended	17,
July 1, 1908, balance available	17,
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	102,

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

June 14, 1880	$40,
March 3, 1881	40,
August 2, 1882	50,
July 5, 1884	10,
August 5, 1886	18,
March 3, 1899	85,
June 13, 1902	50,
March 3, 1905	50,
June 30, 1906	87,
March 2, 1907	35,
	466,
In addition to the above appropriations by Congress, the following additional amount has been received: Proceeds of sales of condemned property	
Total	466,

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CONTRACT IN FORCE.

Contractor: Charles Clarke & Co., Galveston, Tex.
Amount and character of work: Jetty work, 9,000 tons riprap.
Rate: $3.58 per ton in place in jetties.
Date of approval: August 27, 1907.
Date of beginning work: October 25, 1907.
Date of expiration: December 23, 1907. (Time limit waived.)
Contract completed: January 28, 1908.

U 12.

IMPROVEMENT OF ARANSAS PASS AND BAY, TEXAS.

OPERATIONS DURING THE YEAR.

A contract for the extension shoreward of the "Haupt" or north jetty and the construction of a south jetty, in general paralleling the north jetty, together with the necessary wharves, railway trestle, etc., was entered into December 24, 1907. Work was begun by contractor, David M. Picton, March 19, 1908.

A transfer wharf has been constructed on bay side of St. Josephs Island for the transfer of cars of stone to be used in connecting north jetty with shore and across St. Josephs Island. From this wharf a trestle and track has been built across the island into the Gulf of Mexico toward the inshore end of the "Haupt" jetty, a distance of 3,181 feet, at a total cost of $35,007.67.

Work of delivering stone will commence July 10, 1908.

Prior to beginning work on this project a tract of land containing about 168 acres on Mustang Island and one containing about 100 acres on St. Josephs Island were deeded to the United States for military reservations in accord with act of Congress authorizing the appropriation.

SURVEYS.

A map of latest survey is submitted herewith.

Money statement.

July 1, 1907, balance unexpended	$203,325.21
Amount appropriated by sundry civil act approved May 27, 1908	200,000.00
Proceeds of sales of contact prints	3.40
	403,328.61
June 30, 1908, amount expended during fiscal year for works of improvement	29,980.16
July 1, 1908, balance unexpended	373,348.45
July 1, 1908, outstanding liabilities	8,547.30
July 1, 1908, balance available	364,801.15
July 1, 1908, amount covered by uncompleted contracts	436,495.90
Amount (estimated) required for completion of existing project	888,699.50
Amount that can profitably be expended in fiscal year ending June 30, 1910, for works or improvement in addition to the balance unexpended July 1, 1908	290,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

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APPROPRIATIONS.

March 3, 1879	$35,000.00	May 27, 1908	$2
June 14, 1880	65,000.00		
March 3, 1881	80,000.00		1,4
August 2, 1882	100,000.00	In addition to the above appropriations by Congress, the following additional amount has been received: Receipts from sales of contact prints	
July 5, 1884	100,000.00		
August 5, 1886	101,250.00		
August 11, 1888	100,000.00		
March 3, 1899	60,000.00		
June 13, 1902	250,000.00		
March 3, 1905	100,000.00		
June 30, 1906	100,000.00		
March 3, 1907	200,000.00	Total	1,4

CONTRACT IN FORCE.

Contractor: David M. Picton, Rockport, Tex.

Amount and character of work: Jetty work: 80,000 tons riprap; 23,
crest stone; 10,000 linear feet railway trestle and track complete; 12,00
ficial feet transfer wharves complete.

Rate: Riprap properly placed on work, at $3.50 per ton. Crest sto
erly placed on work, at $4.37 per ton. Railway trestle and track com
$6.35 linear foot. Transfer wharves complete, at $2.10 per superficial

Date of approval: January 6, 1908.

Date of beginning work: March 9, 1908.

Date of expiration: October 9, 1909.

COMMERCIAL STATISTICS FOR ARANSAS PASS AND BAY, TEXAS, FO
CALENDAR YEAR 1907.

[Furnished by Mr. B. L. Crouch, special deputy collector, port of Corpus Christ

There was carried from and to the wharves of Corpus Christi, Tex., t
Aransas Pass, Texas, 5,000,000 pounds of general merchandise and 580,0
(1,600,000 pounds) of lumber.

U 13.

IMPROVEMENT OF HARBOR AT BRAZOS SANTIAGO, TEXA

OPERATIONS DURING THE YEAR.

No work was done during the year.

Money statement.

July 1, 1907, balance unexpended	$5,5
Proceeds of sales of condemned property	
	5,5
July 1, 1908, balance unexpended	5,5

APPROPRIATIONS.

June 14, 1880	$25,000.00	August 11, 1888	$25,0
March 3, 1881	75,000.00		
August 2, 1882	60,000.00		247,5
July 5, 1884	25,000.00	Proceeds of sales of condemned property	
August 5, 1886	37,500.00		
		Total	247,5

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U 14.

CONSTRUCTION OF SEA WALL, EMBANKMENT AND FILL ALONG THE FRONT OF THE FORT CROCKETT RESERVATION, GALVESTON, TEXAS, AND CONSTRUCTING SEA WALL FROM THIRTY-NINTH STREET TO THE WEST LINE OF FORTY-FIFTH STREET IN THE CITY OF GALVESTON.

OPERATIONS DURING THE YEAR.

The work of filling, soiling, and sodding Fort Crockett Reservation and behind the sea wall between Thirty-ninth and Forty-fifth streets was carried on under contract entered into with the North American Dredging Company March 20, 1906, and approved May 7, 1906.

There were placed during the year 469,444 cubic yards of fill, of which 8,187.23 cubic yards were top soil and sod, at a cost of 22.99 cents per cubic yard, amounting to $107,925.18.

Work under the contract is about 95 per cent completed.

Under a supplemental contract entered into December 28, 1907, the North American Dredging Company on March 13, 1908, commenced the construction of a retaining wall along the north side of the reservation. Five thousand and thirty-one linear feet of wall have been built, at a cost of $27,961.11, completing about 95 per cent of the work.

Money statement.

July 1, 1907, balance unexpended	$283,355.99
June 30, 1908, amount expended during fiscal year, for works of improvement	139,759.82
July 1, 1908, balance unexpended	143,596.17
July 1, 1908, outstanding liabilities	32,779.33
July 1, 1908, balance available	110,816.84
July 1, 1908, amount covered by uncompleted contracts	76,329.99

APPROPRIATIONS.

April 28, 1904	$591,046.25
June 30, 1906	158,953.75
Total	750,000.00
In addition to the above appropriations by Congress, the following additional amount has been received: Refundment of overpayment	.09
Total	750,000.09

CONTRACTS IN FORCE.

Contractor: North American Dredging Company, San Francisco, Cal.
Amount and character of work: 1,533,700 cubic yards fill, soil and sod.
Rate: Fill, soil, and sod in place, 22.99 cents per cubic yard.
Date of approval: May 7, 1906.
Date of beginning work: July 25, 1906.
Date of expiration: Filling Fort Crockett Reservation and behind sea wall between Thirty-ninth and Forty-fifth streets, October 25, 1907. (Time limit waived.)

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[Supplemental agreement to above contract.]

Contractor: North American Dredging Company, San Francisco, Cal.
Amount and character of work: Retaining wall, 9,000 tons riprap.
Rate: $3.88 per ton of riprap in completed wall, including lean cement plaster backing and necessary back fill.
Date of approval: January 20, 1908.
Date of beginning work: February 28, 1908.
Date of expiration: May 28, 1908.

U 15.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

OPERATIONS DURING THE YEAR.

The U. S. snag boat *Capt. C. W. Howell* on August 31, 1907, removed the remains of a sunken barge at the mouth of Clear Creek, Texas, at a cost of $186.35.

The U. S. revenue cutter *Windom* also removed wreck of oil barge *No. 3*, abandoned by Charles Clarke & Co., lying off Virginia Point, Texas. Dynamite for this purpose was furnished by the Engineer Department at a cost of $90.

Amount expended during fiscal year was as follows:

Operating U. S. dredge *Capt. C. W. Howell*	$176.35
Dynamite	100.00
	276.35

Money statement.

July 1, 1907, balance unexpended	$543.19
June 30, 1908, amount expended during fiscal year, for works of improvement	276.35
July 1, 1908, balance unexpended	266.84

U 16.

OPERATION OF DREDGES.

(A)

DREDGING.

[By U. S. dredge *Gen. C. B. Comstock*, G. M. Prendergast, master.]

The dredge excavated, removed, and dumped from Galveston Harbor cubic yards of material as per following:

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Detailed statement.

Location and character of material.	Amount dredged.		Cubic yards.		Total time pumping, fiscal year.
	Number of loads.	Cubic yards.	Rate per minute pumping.	Rate per hour pumping.	
					Hrs. min.
Outer bar: Sand, clay, and shell	195	111,363	7.53	452	246 35
Inner bar: Sand and silt	672	381,169	7.24	434	877 55
Total	867	492,532	7.30	438	1,124 30

	Cents.
Cost per cubic yard for operating only	4.75
Total cost per cubic yard for operating, repairs, etc., including expense of new boilers	13.08

Distribution of effective working time.

	Hrs.	min.
Pumping	1,124	30
Dumping	84	38
Going to and from dump	295	02
Going to and from wharf or from anchorage to cut	35	44
Total effective working time	1,539	54

Distribution of time lost while in commission.

	Hrs.	min.
Taking fuel and water	42	41
Bad weather	49	26
Washing boilers and ordinary repairs	222	06
Extraordinary repairs	397	16
Sundays and holidays	391	00
Other causes	21	37
Total time lost while in commission	1,124	06

Distribution of time lost while out of commission.

	Hrs.	min.
Extraordinary repairs and laid up	6,120	00
Total time lost while out of commission	6,120	00
Total time accounted for	8,784	00

Money expended.

Wages	$8,161.69
Fuel for boiler (oil)	9,293.84
Fuel for boiler (coal)	3.75
Fuel for galley	111.80
Water	361.40
Supplies, subsistence	2,267.79
Supplies, engine room	885.95
Other supplies	1,148.83
Ordinary repairs	837.40
Laundry, ice, miscellaneous expense, etc	309.38
Extraordinary repairs and alterations and additions to dredge	39,413.01
Office expenses, superintendence, etc	1,629.49
Total expended	64,424.33

Due to an explosion of one of the boilers, the dredge was laid up October 18, 1907, to end of fiscal year, and received complete overhauling, new boilers and pumps, at an expense of $38,751.99.

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(B)

Detailed statement of cost of operating U. S. dredge "Gen. C. B. Comstock" from 1896 to end of fiscal year 1908.

Fiscal year.	Cu. yards excavated.	Operating cost.	Total cost.	Per cubic yard.	
				Operating cost.	Total cost.
				Cents.	Cents.
1896	419,743	$26,947.82	$31,061.35	6.42	7.40
1897	806,646	43,218.51	56,143.02	5.35	7.21
1898	562,976	27,929.23	44,107.51	4.96	7.83
1899	500,702	21,129.36	44,712.08	6.22	8.93
1900	661,088	29,846.22	33,907.09	4.42	5.03
1901 [a]	442,822	33,093.44	60,366.97	7.47	13.65
1902 [b]	181,485	14,376.16	44,508.09	7.9	24.5
1903	613,067	31,367.96	34,522.76	5.1	5.6
1904	674,497	26,974.65	39,894.67	4.0	5.9
1905	1,091,640	37,661.25	51,668.76	3.4	4.7
1906	1,308,865	43,114.86	57,111.61	3.3	4.4
1907 [c]	1,104,407	47,297.01	77,258.94	4.28	7.0
1908 [d]	492,582	28,351.88	64,424.33	4.75	13.08
Total	8,855,425	415,787.60	641,077.18	4.69	7.24

[a] Includes $21,000, cost of floating dredge which stranded on Pelican flat during the hurricane of September 8, 1900.
[b] Extraordinary repairs occasioned by severe hurricane of September 8, 1900, $27,081.93 expended.
[c] Extraordinary repairs occasioned by continual service since 1902.
[d] Extraordinary repairs caused by installing new boilers. Eight months lost awaiting boilers and installing same.
From 1896 to 1905, inclusive, 10 per cent of cost of dredge was included each year in obtaining the figures in the last column.
No allowance since 1905 for depreciation has been made.

(C)

OPERATIONS OF U. S. DREDGE "COL. A. M. MILLER" FROM JULY 1, 1907, TO JUNE 30, 1908.

Total number of cubic yards excavated	2,946,461.00
Number of cubic yards dredged per hour	673.32
Number of cubic yards dredged per minute	11.22

Distribution of time.

	Hrs.	Min.
Pumping	4,374	35
Handling pipe line	323	15
Handling swinging wires	183	20
Total	4,881	10

Distribution of time.

	Hrs.	Min.
Effective working time	4,881	10
Delays changing location of dredge	207	35
Delays taking fuel and water	6	00
Delays for bad weather	228	05
Delays, washing boilers, and ordinary repairs	229	10
Delays for extraordinary repairs	1,454	15
Delays for other causes	630	45
Sundays and holidays	1,152	00
Total time to be accounted for	8,784	00

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Running expenses.

Pay rolls	$26,277.84
Fuel for boilers	81,143.65
Fuel for galley	332.20
Water	272.63
Supplies, subsistence	8,339.70
Supplies, engine room	3,965.24
Other supplies	12,865.95
Renewals of or addition to outfit	5,477.35
Ordinary repairs	280.70
Laundry, miscellaneous expenses, etc	171.52
Tender	8,760.11
Dike and levee	1,443.25
Operating cost	99,330.14
Extraordinary repairs	16,694.68
Alterations and additions	17,461.41
Office expenses, superintendence, surveys, etc	5,229.39
Total cost of dredging	138,715.62

Cost of dredging at each improvement.

Improvement.	Cubic yards removed.	Operating cost.	Operating cost per yard.	Total cost.	Total cost per yard.
			Cents.		Cents.
Galveston channel (new work)	1,632,387	$75,467.46	4.62	$101,593.50	6.22
Galveston ship channel and Buffalo Bayou—division 1 (maintenance)	1,314,074	23,862.68	1.82	37,122.12	2.82
Total	2,946,461	99,330.14	3.36	138,715.62	4.70

(D)

OPERATIONS OF U. S. DREDGE "GEN. H. M. ROBERT". FROM JULY 1, 1907, TO JUNE 30, 1908.

Total number of cubic yards excavated	1,116,635.00
Number of cubic yards dredged per hour	301.62
Number of cubic yards dredged per minute	5.03

Distribution of working time.

	Hrs.	Min.
Pumping	3,702	05
Handling pipe line	434	35
Handling swinging wires	202	00
Total	4,338	40

Distribution of time.

	Hrs.	Min.
Effective working time	4,338	40
Delays, changing location of dredge	141	35
Taking fuel and water	2	15
Delays, for bad weather	260	40
Delays, washing boilers, and ordinary repairs	258	40
Delays for extraordinary repairs	1,634	40
Delays for other causes	1,007	30
Sundays and holidays	1,140	00
Total time to be accounted for	8,784	00

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Running expenses.

Pay rolls	$27, 05
Fuel for boilers	19, 8
Fuel for galley	401.
Water	108.
Supplies, subsistence	8, 92
Supplies, engine room	2, 78
Other supplies	4, 937.
Renewals of or addition to outfit	2, 197.
Ordinary repairs	1, 281.
Laundry, ice, miscellaneous expenses, etc	765.
Tender	5, 609.
Clearing right of way	536.
Operating cost	73, 943.
Extraordinary repairs	19, 33
Alterations and additions	726.
Office expenses, superintendence, surveys, etc	4, 614.
Total cost of dredging	98, 617.

Cost of dredging at each improvement.

Improvement.	Cubic yards removed.	Operating cost.	Operating cost per yard.	Total cost.	Total cost per yard.
			Cents.		*Cents.*
Mouth of Trinity River (Brown's Pass)	28, 989	$752.32	2.14	$855.08	2.
Anahuac channel	162, 028	5, 958.08	3.68	6, 124.99	3.
Double Bayou	54, 994	3, 449.25	6.27	3, 505.45	6.
Cedar Bayou	98, 975	4, 475.14	4.52	4, 642.97	4.
Harbor at Galveston, Tex.—south jetty (repairs)	182, 307	14, 377.61	7.88	15, 592.31	8.
Galveston ship channel and Buffalo Bayou—division 2 (new work)	152, 555	15, 783.98	10.35	27, 910.40	a 18.
Galveston ship channel and Buffalo Bayou—division 2 (maintenance)	55, 865	5, 365.68	9.60	5, 497.54	9.
Galveston channel	385, 922	23, 781.08	6.16	34, 499.18	8.
Total	1, 116, 635	73, 943.04	6.62	98, 617.92	8.

a This item includes $8,600 cost of new boilers not yet installed.

(E.)

Operations of the U. S. dredge "Captain C. W. Howell" from July 1, 1907, to June 30, 1908.

Place.	Date.	Number of yards.	Operating cost per yard.	Total cost per yard. (a)	Remarks.
			Cents.	*Cents.*	
Bastrop Bayou	July 1 to 15, 1907	17, 645	11.31	16.06	Worked as a clam-shell dredge.
Dickinson Bayou	July 17 to Aug. 27, 1907	47, 611	10.27	13.14	Do.
Cedar Bayou Opening.	Aug. 28 to 31, 1907	1, 734	17.09	17.09	Do.
	Sept. 1 to Dec. 10, 1907				Out of commission. Altering to 12-inch suction dredge.
Clear Creek	Dec. 11, 1907, to Feb. 4, 1908	80, 083	11.98	13.10	Working as suction dredge.
West Galveston Bay and Brazos River Canal.	Feb. 19 to June 30, 1908	165, 406	12.62	38.22	Do.
Total		312, 679	12.02	26.22	

a Total cost includes cost of altering from snag boat and clam-shell dredge to 12-inch suction dredge.

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Operating expense for fiscal year	$37,588.06
Alterations and additions to plant, extraordinary repairs, etc	44,393.02
August 31, 1907, dredge removed wreck off mouth of Clear Creek at cost	186.35
Total cost during fiscal year	82,167.43

NOTE.—Cost of movements of *Howell* are included in yardage cost.

(F)

OPERATIONS OF DIPPER DREDGE "THOS. H. BALL" WHILE EMPLOYED BY THE UNITED STATES FROM JANUARY 1, 1908, TO MAY 27, 1908.

[Employed in improving Galveston ship channel and Buffalo Bayou, Texas (Houston Division).]

Cubic yards removed	43,758
Operating cost	$10,861.51
Operating cost per yard, 24.82 cents.	
Rehandling by contractor, at 19.9 cents per yard	8,708.04
Total operating cost per yard, 44.72 cents.	
Cost of three dump scows	9,950.00
Superintendence, surveys, and miscellaneous	1,616.06
Total	31,135.61

Total cost per yard, 71.18 cents.

(G)

OPERATIONS OF U. S. DERRICK BARGE NO. 1 FROM TIME OF COMPLETION, MAY 20, 1908, TO JUNE 30, 1908.

Cost to construct and equip	$8,826.77
Operating cost May 20 to May 31, 1908, as clam-shell dredge	630.00
Operating cost June 1 to June 30, 1908, as snag boat	1,755.35
Total	11,212.12

Improving Galveston ship channel and Buffalo Bayou, Texas.—Removed 101 trees and 107 stumps.

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APPENDIX V.

IMPROVEMENT OF RIVERS AND HARBORS IN THE DALLAS, TEXAS, DISTRICT.

REPORT OF CAPT. W. P. WOOTEN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Johnsons Bayou, Louisiana.
2. Mouths of Sabine and Neches rivers, Texas.
3. Operating and care of Port Arthur Canal, Texas.
4. Harbor at Sabine Pass, Texas.
5. Brazos River, Texas, from Old Washington to Waco.
6. Brazos River, Texas, from Velasco to Old Washington.
7. Trinity River, Texas.
8. Cypress Bayou, Texas and Louisiana.
9. Red River, above Fulton, Arkansas.
10. Sulphur River, Texas and Arkansas.

UNITED STATES ENGINEER OFFICE,
Dallas, Tex., July 20, 1908.

SIR: I have the honor to forward herewith annual reports for the fiscal year ending June 30, 1908, upon the works of river and harbor improvement in the Dallas, Tex., district.

Very respectfully, your obedient servant,

W. P. WOOTEN,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

V 1.

IMPROVEMENT OF JOHNSONS BAYOU, LOUISIANA.

[This work was in the charge of Maj. J. F. McIndoe, Corps of Engineers, to April 1, 1908.]

An examination of the bar at the mouth of the bayou was made and a report submitted August 19, 1907, in which the opinion was given that this stream is unworthy of further expenditure by the United States for either improvement or maintenance. No other work has been done.

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Money statement.

July 1, 1907, balance unexpended	$2,500.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	46.00
July 1, 1908, balance unexpended	2,454.00

APPROPRIATIONS.

By act of Congress—	
Approved March 3, 1899	$2,500.00
Approved March 2, 1907	2,500.00
Total	5,000.00
Reverted to Treasury	238.65
Net total	4,761.35

V 2.

IMPROVEMENT OF THE MOUTHS OF THE SABINE AND NECHES RIVERS, TEXAS.

[This work was in the charge of Maj. J. F. McIndoe, Corps of Engineers, to April 1, 1908.]

During the year dredging under contract with Bowers Southern Dredging Company, of Galveston, Texas, was continued, the canal connecting the mouths of the Sabin and Neches rivers with mouth of Taylors Bayou, Texas, being completed February 20, 1908.

Dredging for this canal was begun March 1, 1906, at the mouth of Sabine River. A second dredge was put on the work at the mouth of Taylors Bayou, Texas, July 5, 1906, being withdrawn April 27, 1907, and put back again November 12, 1907. Both dredges then remained at work until the close of the contract.

The quantities of excavation removed during each fiscal year are as follows:

	Cubic yards.
1906	750,169.20
1907	2,482,159.56
1908	1,114,085.62
Total	4,346,414.38

The contract price was 8 cents per cubic yard.

Contract for an extension of the above canal, to permit of canal making junction with Port Arthur Ship Canal below ship turning basin, instead of at head of basin, was advertised January 21, 1908, and contract for the necessary dredging was let to the Bowers Southern Dredging Company, of Galveston, Tex., at 12 cents per cubic yard. Dredging for the extension was begun April 8, 1908, and completed May 23, 1908.

Length of extension, 4,200 feet.
Cubic yards in contract, 261,394.24.

Total length of completed canal, from Port Arthur Ship Canal to mouth of Sabine River, is 84,660 feet, or practically 16 miles.

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Money statement.

July 1, 1907, balance unexpended	$241,764.60
Amount received from sale of blueprints	1.00
	241,765.60
June 30, 1908, amount expended during fiscal year for works of improvement	154,044.00
July 1, 1908, balance unexpended	87,721.60
July 1, 1908, outstanding liabilities	93.97
July 1, 1908, balance available	87,627.63

APPROPRIATIONS.

March 3, 1899	$10,000.00
June 13, 1902	125,000.00
June 30, 1906	411,500.00
Receipts from sales	3.60
Total	546,503.60

CONTRACT IN FORCE.

Name and address of contractor: Bowers Southern Dredging Company, Galveston, Tex.
Work: Dredging about 250,000 cubic yards.
Prices per unit: Dredging, 12 cents per cubic yard.
Date of approval: April 8, 1908.
Date of beginning work: May 8, 1908.
Date of expiration: May 23, 1908; completed.

COMMERCIAL STATISTICS.

[From January 1, 1907, to December 31, 1907.]

NECHES RIVER.

Vessels entering and departing.

Class.	Number.	Trips.	Net registered tonnage.
Steamers	14	230	2,041
Barges	7	176	18,512
Total	21	406	20,553

Shipments and receipts by water.

Article.	Tons.	Value.	Article.	Tons.	Value.
SHIPMENTS.			RECEIPTS.		
Sand and shell	81,800	$122,700	Logs	52,490	$104,776
Lumber and shingles	5,000	45,000	Merchandise and machinery	500	23,000
Fuel oil	7,500	33,096	Rice	250	10,500
Cord wood and coal	1,000	4,000	Miscellaneous	250	5,000
Spring water	1,000	2,000			
Produce	250	5,000	Total	53,490	143,276
Total	96,550	216,796			

Grand total, 150,040 tons, valued at $360,072.

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SABINE RIVER.

Vessels entering and departing.

Class.	Number.	Trips.	Net registered tonnage.
Steamers	7	162	1,443
Sailing vessels	2	4	280
Barges	11	171	30,925
Total	20	337	32,648

Shipments and receipts by water.

Article.	Tons.	Value.	Article.	Tons.	Value.
SHIPMENTS.			RECEIPTS.		
Lumber and shingles	44,958	$404,600	Logs	352,000	$880,000
Sand and shell	6,185	12,370	Merchandise	230	17,250
Rice	785	29,437	Feed and fertilizer	280	5,600
Cattle	500	30,000	Fuel oil and coal	164	1,600
Cotton and cotton seed	20	3,260	Brick, lime, and cement	50	400
Total	52,448	479,667	Total	352,724	904,850

Grand total, 405,172 tons, valued at $1,384,517.

V 3.

OPERATING AND CARE OF PORT ARTHUR CANAL, TEXAS.

[This work was in the charge of Maj. J. F. McIndoe, Corps of Engineers, to April 1, 1908.]

In August, 1907, the ship turning basin at the head of this canal was found to be shoaling up rapidly. The U. S. dredge *Port Arthur*, which had been bought for such work, not having been completely repaired, the redredging of this turning basin was let out by contract to the Bowers Southern Dredging Company. An hydraulic dredge was hired from them to dredge in this basin for 450 hours, at $20 per hour. This dredging began September 3 and was completed September 23, 1907, resulting in the removal of 100,567 cubic yards, at a cost of $9,000.

The repairing and fitting out of hydraulic dredge *Port Arthur*, which was bought of the Port Arthur Canal and Dock Company in May, 1907, was completed January 21, 1908. The dredge was then towed to the upper end of Port Arthur Ship Canal, where it was thoroughly tried out, and then taken to a point in canal near Round Lake, where a shoal had formed. From February 14 to April 6, 1908, while working near Round Lake, 52 days, this dredge removed 38,605.7 cubic yards of material, place measurement, soft silt and sand, at a field cost of dredging of $3,425.24, or $0.089 per cubic yard. On completion of this work the dredge was towed to the lower mouth of the canal, where it was dredging at the close of the fiscal year.

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Summary of expenses for operating and care of Port Arthur Canal, Texas, for the fiscal year ending June 30, 1908.

Repairs to dredge	$8,904.10
Dredging and contingencies	20,576.18
Completion of revetment	58.67
Surveys	332.71
Office and miscellaneous expenses and administration	699.69
Total	30,571.35

ALLOTMENTS.

March 1, 1907	$30,000.00
July 12, 1907	18,989.08
Sale of blueprints	1.25
Total	48,990.33

ESTIMATE.

Amount (estimated) for fiscal year ending June 30, 1909	$25,000.00
Balance from allotment for preceding year	2,646.19
Additional allotment required for fiscal year ending June 30, 1909	22,353.81

V 4.

IMPROVEMENT OF HARBOR AT SABINE PASS, TEXAS.

[This work was in the charge of Maj. J. F. McIndoe, Corps of Engineers, to April 1, 1908.]

Maintenance of jetty channel.—The U. S. dredge *Sabine* was operated in the jetty channel from July 27, 1907, on its return from New Orleans, La., after its annual overhauling, to end of the fiscal year.

During the year the dredge removed and carried out to sea 2,547 loads of soft blue mud, estimated place material, 60 per cent of bin measurement, 496,665 cubic yards, at a cost of $28,922.57, including repairs and additions and cost of administration, or $0.0582 per cubic yard.

The distribution of the dredge's time during the year is as follows:

	Hrs.	min.
Working time	2,683	30
Lost time	886	20
Total	3,569	50

Distribution of working time.

	Hrs.	min.
Under way	1,317	35
Pumping	1,035	45
Dumping	211	25
Taking on fuel oil	118	45
Total	2,683	30

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Distribution of lost time.

	Hrs.	min.
Rough sea and fog	319	45
Ordinary repairs	163	55
Extraordinary repairs (in dry dock and overhauling dredge and machinery at New Orleans, La.)	288	00
Washing out boilers	92	00
Assisting vessels over bar	6	55
Miscellaneous	15	45
Total	886	20

The cost of the work during the year was $28,922.57, distributed as follows:

Wages of crew	$10,968.96
Wages of subsistence department	820.34
Office expenses	650.34
Subsistence supplies	2,614.68
Fuel oil	7,960.44
Deck and engine-room supplies	1,549.99
Ordinary repairs	573.99
Extraordinary repairs	3,698.98
Miscellaneous supplies	84.35
Total cost of dredging	28,922.57

The act of March 2, 1907, appropriated $160,000 for continuing improvement and for maintenance, and authorized contracts for materials or work to the amount of $200,000 additional. By act of May 27, 1908, there was appropriated $190,000 of this authorization, leaving yet to be appropriated $10,000. On June 15, 1907, bids were opened for raising the low sections of east jetty at inner and outer ends to the height of 4 feet above mean low tide, and under date of June 25, 1907, a contract was entered into with Charles Clarke & Co., of Galveston, Tex., for this work.

During the year 62,901.53 tons of riprap stone has been placed under this contract, completing repairs for a total distance of 6,800 feet. It is estimated that approximately 60 per cent of this work has been completed.

It would appear that the result of the improvement at Sabine Pass had had a marked effect in decreasing the freight rate on shipments to the seaboard, as the State railway commission has given Sabine and Port Arthur a low rate, called a differential, of 7 cents per hundred on first-class freight from Beaumont to Sabine or Port Arthur, applying on all freight from interior points in Texas to Sabine or Port Arthur. This was done merely to equalize the rate, or differential, from Houston to Galveston, and was done only when it was shown to the commission that Sabine and Port Arthur were deep-water exporting points. It amounts to this: That all freight from interior Texas points for export through Sabine or Port Arthur pays the regular tariff rates to Beaumont, plus but 7 cents first-class freight, to be then hauled to Sabine, though the regular tariff from Beaumont to Sabine is 20 cents.

It is proposed to apply the additional appropriation recommended to making payments on the contract referred to, and to maintaining the dredge *Sabine* in proper repair, and operating same in the channel between the jetties.

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Money statement.

July 1, 1907, balance unexpended		$158,834.88
Amount received from sale of blueprints		4.50
Amount appropriated by sundry civil act approved May 27, 1908		190,000.00
		348,839.38
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$125,290.53	
For maintenance of improvement	28,926.57	
		154,217.10
July 1, 1908, balance unexpended		194,622.28
July 1, 1908, outstanding liabilities		1,757.53
July 1, 1908, balance available		192,864.75
July 1, 1908, amount covered by uncompleted contracts		135,780.36
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$110,000.00	
For maintenance of improvement	100,000.00	
		210,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 30, 1852 (survey)	$5,000.00	March 3, 1899	$264,000.00
June 10, 1873 (survey)	2,000.00	March 3, 1899	150,000.00
March 3, 1875	20,000.00	June 6, 1900	36,000.00
August 14, 1876	38,000.00	June 6, 1900 (allotted)	10,000.00
June 18, 1878 (allotted)	30,000.00	June 13, 1902	185,000.00
March 3, 1879	25,000.00	March 3, 1905	150,000.00
June 14, 1880	50,000.00	March 2, 1907	160,000.00
March 3, 1881	150,000.00	May 27, 1908	190,000.00
August 2, 1882	150,000.00	Total	4,139,750.00
July 5, 1884	200,000.00	Reverted to Treasury from act of June 4, 1897	16,297.03
August 5, 1886	198,750.00	Net total	4,123,452.97
August 11, 1888	250,000.00	Amount received from other sources	2,984.05
September 19, 1890	300,000.00	Total	4,126,437.02
July 13, 1892	350,000.00		
August 18, 1894	[a] 271,000.00		
June 3, 1896	75,000.00		
June 4, 1897	480,000.00		
July 1, 1898	400,000.00		

CONTRACTS IN FORCE.

Name and address of contractor: Sun Pipe Line Company, Beaumont, Tex.
Work: Furnishing about 4,000 barrels of fuel oil for *Sabine*.
Contract price: 97 cents per barrel.
Date of approval: Emergency contract, dated March 28, 1908.
Date of beginning: March 31, 1908.
Date of expiration: September 2, 1908.

Name and address of contractor: Higgins Oil and Fuel Company, Beaumont, Tex.
Work: Furnishing about 8,500 barrels of fuel oil for *Sabine*.
Contract price: $1.25 per barrel.

[a] The total amount of this appropriation was originally $275,000, but of this sum $4,000 was allotted by sundry civil act of March 2, 1895, for dredging through a bar at the mouth of the Sabine River, Texas, and was expended on that improvement.

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Date of approval: Emergency contract, dated October 10, 1907.
Date of beginning: October 13, 1907.
Date of expiration: April 2, 1908; completed.

Name and address of contractor: Higgins Oil and Fuel Company, Beaumont, Tex.
Work: Furnishing about 2,000 barrels of fuel oil for *Sabine*.
Contract price: $1.05 per barrel.
Date of approval: Emergency contract, dated January 2, 1908.
Date of beginning: January 5, 1908.
Date of expiration: April 30, 1908; completed.

Name and address of contractor: Charles Clarke & Co., Galveston, Tex.
Work: Repairing and rebuilding east jetty at Sabine Pass, Tex.
Contract price: $2.59½ per ton of riprap stone placed.
Date of approval: July 17, 1907.
Date of beginning: August 2, 1907.
Date of expiration: January 2, 1909.

COMMERCIAL STATISTICS.

[From January 1, 1907, to December 31, 1907.]

Vessels entering and departing.

Class.	Number.	Trips.	Net registered tonnage.
Steamers	107	329	600,886
Sailing vessels	30	49	87,787
Barges	17	133	177,011
Totals	154	511	865,384

Shipments and receipts by water.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
SHIPMENTS.			RECEIPTS.		
Crude petroleum	861,986	$3,831,029	Creosote	2,205	$55,125
Refined petroleum	573,429	7,281,640	Coal	1,107	5,535
Sulphur	143,796	2,588,328	Machinery, iron pipes, etc.	168	15,300
Lumber	108,206	928,854	Miscellaneous	50	3,750
Cotton	30,081	6,617,985	Total	3,525	89,710
Corn and wheat	84,217	2,326,950			
Asphalt and paint	42,494	509,928			
Cotton-seed meal, etc.	4,967	89,406			
Merchandise	208	15,600			
Staves	150	3,750			
Walnut and ash logs	100	1,600			
Total	1,844,634	24,195,070			

Grand total, 1,848,159 tons, valued at $24,275,780.

V 5.

IMPROVEMENT OF BRAZOS RIVER FROM OLD WASHINGTON TO WACO.

The work done during the year consisted in completing the concrete in the land wall of Lock No. 1 at Hidalgo Falls, back filling behind land wall, excavating for foundation of river wall and floor, driving round piles and sheet piles for foundation of river wall and floor, and placing concrete in the lower portion of the river wall.

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Prolonged high water during the winter and spring has delayed the work. An unusual and excessive flood during the last week of May washed the bank behind the land wall very badly and partially wrecked the plant. The water has only recently subsided to a point which would enable a survey to be made showing the exact extent of the damage. Such a survey has been made and a report thereon will be submitted at an early date. The floods have also increased the amount of excavation by depositing large quantities of sand and silt where excavation had already been made.

Of the principal items of work the quantities were as follows:

Kind.	Unit.	Quantity.
Excavation	Cubic yards	40,200
Filling	do	6,050
Concrete	do	3,661
Sheet piles	Number	308
Round piles	do	234

ESTIMATE.

It is proposed to expend the available balance in continuing the construction of Lock and Dam No. 1 at Hidalgo Falls. In addition the following appropriations and authorizations are recommended:

The appropriation of $50,000 already authorized for completing Lock and Dam No. 1.

The appropriation of $150,000, accompanied by authority to enter into continuing contracts for the expenditure of $450,000 additional, for the construction of Locks and Dams Nos. 2 and 3.

Money statement.

July 1, 1907, balance unexpended	$62,251.31
Amount refunded account of disallowance on voucher	.96
Amount appropriated by sundry civil act approved May 27, 1908	100,000.00
	162,252.27
June 30, 1908, amount expended during fiscal year for works of improvement	60,837.91
July 1, 1908, balance unexpended	101,414.36
July 1, 1908, outstanding liabilities	1,080.68
July 1, 1908, balance available	100,333.68
Amount (estimated) required for completion of existing project	*50,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	200,000.00

APPROPRIATIONS.

March 3, 1905	$75,000.00
March 2, 1907	75,000.00
May 27, 1908	100,000.00
Overpayment refunded	.96
Total	250,000.96

*For Lock and Dam No. 1 only.

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COMMERCIAL STATISTICS.

Owing to the fact that the improvement is just beginning, no commerce of account has yet developed.

V 6.

IMPROVEMENT OF BRAZOS RIVER, TEXAS, FROM VELASCO TO OLD WASHINGTON.

During the year 1,500 feet of brush and pile jetty was completed and 928 feet partly completed. The jetty work was done at Miles 73, 75, 82, 83, and 85. Snagging operations were carried on between Miles 27 and 73 and 399 snags and 168 stumps were destroyed, 1,477 logs and one sunken barge were removed from the channel, 1 side jam was removed, and 3,488 shore snags and 1,687 leaning trees were cut up.

Exceptional and prolonged high water has seriously delayed the work.

It is estimated that from Velasco to Richmond, a distance of 100 miles, approximately 80 per cent of the project has been completed, and from Richmond to Old Washington, a distance of 152 miles, practically 50 per cent has been completed, thus making about 62 per cent of the entire project completed.

ESTIMATE.

An appropriation of $40,000 is recommended for maintaining the improvement.

Money statement.

July 1, 1907, balance unexpended	$72,454.52
June 30, 1908, amount expended during fiscal year for works of improvement	18,127.74
July 1, 1908, balance unexpended	54,326.78
July 1, 1908, outstanding liabilities	674.10
July 1, 1908, balance available	53,652.68
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	40,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 3, 1896	$5,000
June 13, 1902	150,000
March 3, 1905	25,000
March 2, 1907	75,000
Total	255,000

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COMMERCIAL STATISTICS.

No commercial statistics were obtainable for the river above Velasco.

V 7.

IMPROVEMENT OF TRINITY RIVER TEXAS.

LOCK AND DAM NO. 1.

The lock has been completed with the exception of the lower gates, which have not yet been placed. The excavation for the dam and abutment and the construction of the cofferdam for the permanent dam have been almost completed.

LOCKS AND DAMS NOS. 2 AND 4.

The land for the sites has been secured and the contracts for the construction let to the Ball-Carden Company. Prolonged high water has delayed the commencement of this work and has greatly retarded all other work on the Trinity River, but at the end of the fiscal year the plant was being erected for carrying on the work.

LOCK AND DAM NO. 6.

The work has consisted of excavation for land wall, driving piles for foundation of land wall and cribs, and the construction of the cofferdam, which is about half completed.

LOCK AND DAM AT HURRICANE SHOALS.

A survey of the site was made and plans and specifications have been prepared. The land for the site has not yet been deeded to the United States.

OTHER WORK.

The snag boats *Trinity* and *Wolff*, the two quarter boats, and the launch *Holland* have been engaged in removing obstructions to navigation. The *Wolff* sunk in October and the quarter boat *Sofie* in June. Both boats were old and rotten and did not have sufficient strength left to permit them to be raised.

About 180 miles of the river have been gone over and the following work done:

Snags destroyed	8,171
Stumps destroyed	315
Logs removed from channel	1,365
Jams destroyed	83
Leaning trees cut	11,725
Shore snags cut	4,564

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ESTIMATE.

The amounts expended during the year and the unexpended balances July 1, 1908, were as follows:

	Expended during year.	Balance unexpended July 1, 1908.
Constructing Locks and Dams Nos. 1, 2, and 6	$46,695.54	$298,101.46
Constructing Lock and Dam No. 4 and lock and dam at Hurricane shoals	7,004.95	122,562.05
Funds contributed by citizens of Dallas		57,600.00
Improvement below section 1	10,050.60	
Maintenance	24,374.47	10,613.53
Total	88,125.56	488,877.04

The unexpended balances will be applied to the prosecution of the work to which they pertain.

In addition the following appropriations and authorizations are recommended:

The appropriation of $125,000 of the $210,000 already authorized for continuing the construction of Lock and Dam No. 4 and the lock and dam at Hurricane shoals.

The appropriation of $150,000, accompanied by authority to enter into continuing contracts for the expenditure of $450,000 additional for the construction of Lock and Dam No. 7, a lock and dam at White Rock shoals, and a lock and dam near Mile 360.

The appropriation of $75,000 for operating snag boats and continuing the removal of obstructions, etc.

Money statement.

July 1, 1907, balance unexpended		$486,925.25
Sales of condemned property and blueprints		77.77
Amount appropriated by sundry civil act approved May 27, 1908		90,000.00
Refundment for overpayment		.12
		577,003.29
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$63,751.09	
For maintenance of improvement	24,374.47	
		88,125.56
July 1, 1908, balance unexpended		488,877.64
July 1, 1908, outstanding liabilities		2,154.12
July 1, 1908, balance available		486,723.52
July 1, 1908, amount covered by uncompleted contracts		467,090.78
Amount (estimated) required for completion of existing project		*210,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.		350,000.00

* Applies only to works already specifically authorized by Congress.

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APPROPRIATIONS.

March 3, 1899	$7,000.00
June 13, 1902	125,000.00
March 3, 1903	250,000.00
June 30, 1906	111,000.00
March 2, 1907	75,000.00
March 4, 1907	75,287.00
May 27, 1908	90,000.00
Total appropriations	733,287.00
Received from citizens of Dallas, Tex	66,000.00
Received from sales of condemned property	109.04
Refunded for overpayment	.18
Total	799,396.22

CONTRACTS IN FORCE.

1.

Name of contractor: D. C. McCord.
Character of work: Construction of Lock and Dam No. 1 and dam at Parsons Slough.
Amount: $135,792.18.

Unit prices.

Classification.		Lock and Dam No. 1.	Dam at Parsons Slough.
Grubbing and clearing	acres	$15.30	$15.30
Excavation	cubic yards	.36	.37
Round timber	linear feet	.06	.06
Round piles	do	.19½	.25
Brush	cords	2.40	3.00
Concrete in lock walls	cubic yards	7.10	.....
Other concrete	do	7.10	.....
Boule gates	feet B. M.	72.00	.....
Oak timber	do	.12	.....
Timber in permanent work	do	84.00	90.00
Timber in cribs	do	54.00	60.00
Riprap	cubic yards	4.92	5.25
Iron and steel	pounds	.11	.10
Steel reenforcing rods	do	.07	.09
Chain	do	.13	.14
Drift bolts	do	.09	.....
Sheet piling	feet B. M.	60.00	65.00
Sheet piling, steel	linear feet	3.00	.....
Plain filling	cubic yards	.18	.....
Compacted filling	do	.48	.55
Riprap paving	square feet	.18	.....
Paving on spalls	do	.21½	.25
Paving in concrete	do	.32½	.36
Paving for cribs	do	.36	.32½
Sand bags	each	.12	.15
Gauges	linear feet	3.00	4.00
Crab, crane, and service car	pounds	.23	.....
Frames with rollers	each	10.80	.....
Drains under lock floor	linear feet	.60	.....
Concrete	cubic yards	.....	8.00
Surface soil	do	.....	1.00
Crab	pounds	.....	.20

Date of approval: March 26, 1906.
Date of beginning: March 31, 1906.
Date of expiration: December 1, 1907.*

2.

Name of contractor: Hubbard Building and Realty Company.
Character of work: Construction of Lock and Dam No. 6.
Amount: $144,113.95.

*Extended for a reasonable length of time.

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Unit prices.

Classification.		Lock and Dam No. 4.
Grubbing and clearing	acres..	$100.00
Excavation	cubic yards..	.40
Round timber	linear feet..	.30
Round piles	do....	.50
Brush	cords..	10.00
Concrete	cubic yards..	7.50
Boule gates	feet B. M..	60.00
Oak timber	do....	.05
Timber in permanent work	do....	50.00
Timber in cribs	do....	50.00
Riprap	cubic yards..	5.00
Iron and steel	pounds..	.05½
Steel reenforcing rods	do....	.07
Chain	do....	.07½
Drift bolts	do....	.05
Sheet piling	feet B. M..	60.00
Sheet piling, steel	linear feet..	.75
Plain filling	cubic yards..	.30
Compacted filling	do....	.40
Riprap paving	square feet..	.40
Paving on spalls	do....	.60
Paving in concrete	do....	.50
Paving for cribs	do....	.25
Sand bags	each..	.10
Gauges	linear feet..	.50
Crab, crane, and service car	pounds..	.25
Frames with rollers	each..	2.00
Drains under lock floor	linear feet..	.50

Date of approval: July 28, 1906.
Date of beginning: October 10, 1906.
Date of expiration: September 1, 1908.

3.

Name of contractor: Ball-Carden Company.
Character of work: Construction of Lock and Dam No. 2.
Amount: $125,482.36.

Unit prices.

Classification.		Lock and Dam No. 2.
Grubbing and clearing	acres..	$200.00
Excavation	cubic yards..	.40
Round timber	linear feet..	.32
Round piles	do....	.50
Brush	cords..	10.00
Concrete	cubic yards..	7.00
Boule gates	feet B. M..	60.00
Oak timber	do....	.10
Timber in permanent work	do....	50.00
Timber in cribs	do....	50.00
Riprap	cubic yards..	4.00
Iron and steel	pounds..	.053½
Steel reenforcing rods	do....	.057½
Chain	do....	.099½
Drift bolts	do....	.05
Sheet piling	feet B. M..	60.75
Sheet piling, steel	square feet..	1.75
Plain filling	cubic yards..	.30
Compacted filling	do....	.40
Riprap paving	square feet..	.40
Paving on spalls	do....	.40
Paving in concrete	do....	.40
Paving for cribs	do....	.25
Sand bags	each..	.10
Gauges	linear feet..	2.50
Crab, crane, and service car	pounds..	.25
Frames with rollers	each..	7.00
Drains under lock floor	linear feet..	.50
Timber in coffer dam	feet B. M..	50.00

Date of approval: June 3, 1908.
Date of beginning: August 8, 1908.
Date of expiration: February 9, 1910.

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4.

Name of contractor: Ball-Carden Company.
Character of work: Construction of Lock and Dam No 4.
Amount: $126,338.91.

Unit prices.

Classification.		Lock and Dam No. 4.
Grubbing and clearing	per acre..	$290.00
Excavation	per cu. yd..	.40
Round timber	per lin. ft..	.32
Round piles	do....	.50
Brush	per cord..	50.00
Concrete	per cu. yd..	7.00
Boule gates	per ft. B. M..	50.00
Oak timber	do....	.10
Timber in permanent work	do....	50.00
Timber in cribs	do....	50.00
Riprap	per cu. yd..	4.69
Iron and steel	per pound..	.0624
Steel reenforcing rods	do....	.0574
Chain	do....	.0995
Drift bolts	do....	.05
Sheet piling	per ft. B. M..	50.75
Sheet piling, steel	per sq. ft..	1.75
Plain filling	per cu. yd..	.30
Compacted filling	do....	.40
Riprap paving	per sq. ft..	.40
Paving on spalls	do....	.40
Paving in concrete	do....	.40
Paving for cribs	do....	.25
Sand bags	each..	.10
Gauges	per lin. ft..	2.50
Crab, crane, and service car	per pound..	.25
Frames with rollers	each..	7.00
Drains under lock floor	per lin. ft..	.50
Timber in cofferdam	per ft. B. M..	50.00

Date of approval: January 31, 1908.
Date of beginning: April 20, 1908.
Date of expiration: October 20, 1909.

COMMERCIAL STATISTICS.

Only very incomplete statistics have been obtainable. The only commercial boat reported is the tug *Helen*, of 17 tons, 6½-foot draft, with barges 5 and 5½ foot draft, which has made 50 trips between Wallisville and Galveston or Houston, carrying 2,275 tons of lumber, 600 tons saw logs, 400 tons piling, and 450 tons square timber. Saw logs to the amount of 1,626,706 feet B. M. are reported as having been rafted out. Other timber reported rafted, 200,000 feet B. M.

V 8.

IMPROVEMENT OF CYPRESS BAYOU, TEXAS AND LOUISIANA.

On July 8 the quarter boat resumed work cleaning and marking the channel between Jefferson and Mooringsport, a distance of 37.5 miles. Work was continued until January 4, when the boat was laid up at Jefferson. As soon as a favorable stage of water is reached work will be resumed. The work done during the year was as follows:

Stumps destroyed	2,897
Shore snags cut	3,617
Leaning trees cut	90
Jams destroyed	1
Logs removed from channel	637
Sunken barges removed	1
Markers placed for channel in Caddo Lake	115

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ESTIMATE.

The amount expended during the fiscal year was $4,761.68. The available balance July 1, 1908, was $3,497.48. The unexpended balance will be applied to continue the work of maintaining the channel free of obstructions. In addition an appropriation of $6,000 is recommended for the same purpose.

Money statement.

July 1, 1907, balance unexpended	$8,397.67
Refundment for overpayment	2.03
	8,399.70
June 30, 1908, amount expended during fiscal year for works of improvement	4,761.68
July 1, 1908, balance unexpended	3,638.02
July 1, 1908, outstanding liabilities	140.54
July 1, 1908, balance available	3,497.48
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	6,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

June 10, 1872	$10,000.00
March 3, 1873	50,000.00
August 14, 1876	13,000.00
June 18, 1878	15,000.00
March 3, 1879	6,000.00
August 5, 1886	18,000.00
August 11, 1888 (allotted from appropriation for Red River)	5,000.00
September 19, 1890 (for survey)	10,000.00
July 13, 1892 (for survey)	2,000.00
June 13, 1892 (allotted from appropriation for Red River)	1,701.33
August 18, 1894	10,000.00
June 3, 1896	5,000.00
March 2, 1907	10,000.00
Refunded for overpayment	2.03
Total	155,703.36

COMMERCIAL STATISTICS.

No commercial statistics were obtainable during the year.

V 9.

IMPROVEMENT OF RED RIVER ABOVE FULTON, ARKANSAS.

Three quarter boats were at work whenever the water stage permitted. A snag boat, *C. A. Culberson*, was in course of construction

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during the year and was completed and delivered at Fulton, Ark., June 29.

A survey of the river from the mouth of the Washita to Fulton, Ark., has been begun. Exceptional floods have delayed all work on this river. The work done was as follows:

Snags destroyed	13,264
Stumps destroyed	3,266
Shore snags cut	33,198
Logs removed from channel	2,927
Jams destroyed	221
Trees cut from caving banks	107,991
Square yards of brush cut	68,660

ESTIMATE.

No estimate is sumbitted for further appropriations, as it is believed that this can be done more intelligently after the completion of the survey.

Money statement.

July 1, 1907, balance unexpended		$132,443.91
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$56,193.60	
For survey	5,402.01	
		61,595.61
July 1, 1908, balance unexpended		70,848.30
July 1, 1908, outstanding liabilities		2,466.67
July 1, 1908, balance available		68,381.63
July 1, 1908, amount covered by uncompleted contracts		2,184.00

APPROPRIATIONS.

August 5, 1886	$7,000
August 11, 1888	3,000
September 19, 1890	2,000
July 13, 1892	3,500
August 17, 1894	3,500
June 3, 1896	3,000
June 13, 1902	10,000
March 3, 1905	100,000
March 2, 1907	100,000
Total	232,000
February 23, 1901, received from sale of snag boat	1,500
Total	233,500

CONTRACT IN FORCE.

Name of contractor: M. A. Sweeney Shipyard and Foundry Company.
Character of work: Construction and delivery of one snag boat.
Price: $21,840.
Date of approval: April 17, 1906.
Date of beginning work: April 20, 1906.
Date of expiration of work: December 17, 1906.*

* Extended for a reasonable length of time.

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COMMERCIAL STATISTICS.

Reports received show 2,600,000 feet B. M. of saw logs rafted. The steamer *D. R. Porter* moved two barges of lumber, or 247 tons. The steamer *D. Cowley*, of 19 tons, 2-foot draft, made 31 trips between Boggy and Arthur City to Garland City, Ark., moving 10,000 logs.

V 10.

IMPROVEMENT OF SULPHUR RIVER, TEXAS AND ARKANSAS.

A quarter boat was constructed and began work on September 12. High water has retarded the work very greatly. The following work was done during the year:

Snags destroyed	876
Stumps destroyed	1,105
Jams destroyed	12
Logs removed	1,408
Shore snags cut	1,854
Leaning trees cut	4,516
Square yards brush cut	9,020

Money statement.

July 1, 1907, balance unexpended	$36,000.00
June 30, 1908, amount expended during fiscal year, for works of improvement	8,139.16
July 1, 1908, balance unexpended	27,860.84
July 1, 1908, outstanding liabilities	180.10
July 1, 1908, balance available	27,680.74

APPROPRIATIONS.

August 18, 1894 (allotted from appropriation for Red River)	$2,488.99
March 2, 1907	36,000.00
Total	38,488.99

COMMERCIAL STATISTICS.

Owing to the fact that the improvement is just beginning, no commerce of any account has yet developed.

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APPENDIX W.

IMPROVEMENT OF RIVERS AND HARBORS IN THE VICKSBURG, MISSISSIPPI, DISTRICT.

REPORT OF CAPT. CLARKE S. SMITH, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Red River, Louisiana and Arkansas, below Fulton, Arkansas.
2. Ouachita and Black rivers, Arkansas and Louisiana.
3. Bayou Bartholomew, Boeuf River, Tensas River and Bayou Macon, and Bayous D'Arbonne and Corney, Louisiana and Arkansas.
4. Mouth of Yazoo River and harbor at Vicksburg, Mississippi.
5. Yazoo, Tallahatchie, Coldwater, and Big Sunflower rivers, and Tchula Lake, Mississippi.

UNITED STATES ENGINEER OFFICE,
Vicksburg, Miss., July 16, 1908.

SIR: I have the honor to send herewith annual reports for the fiscal year ending June 30, 1908, upon the works of river and harbor improvement of the Vicksburg, Miss., district.

This district was in charge of Capt. G. M. Hoffman, Corps of Engineers, to December 15, 1907, when it was transferred to me under Special Orders, No. 270, paragraph 20, dated War Department, November 16, 1907.

Very respectfully, your obedient servant,

CLARKE S. SMITH,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

W 1.

IMPROVEMENT OF RED RIVER, LOUISIANA AND ARKANSAS, BELOW FULTON, ARKANSAS.

Work for the improvement of the river below Fulton, Ark., to the head of Atchafalaya River, Louisiana, was continued during the fiscal year ending June 30, 1908, under the direct supervision of Mr. H. M. Marshall, assistant engineer, as follows:

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GENERAL IMPROVEMENT.

Operations of the U. S. snag boat *C. W. Howell* were continuous, except during short periods when the boat was undergoing minor repairs, and extended over the river from Fulton, Ark., to the head of the Atchafalaya River, Louisiana, 508.6 miles below. The *Howell* was in command of James H. Britton, master.

The following is a summary of the work performed by the *Howell* during the year:

Snags pulled and destroyed	1,261
Stumps pulled and destroyed	241
Logs removed from channel	3
Shore snags cut	913
Leaning trees felled and cut up	12,245
Leaning trees topped	31
Trees girdled	4
Square yards of willows and brush cut	45

During the extraordinary flood of Red River in June, 1908, the snag boat *Howell* and the new snag boat *Jos. E. Ransdell* were employed for relief work, transporting material and laborers for protection of the levees and distributing rations for relief of flood sufferers. This flood reached a stage at Alexandria, La., prior to the close of the fiscal year over 3 feet above that of any previously recorded flood, and considerable damage was done to levees and property.

The work of the snag boat *Howell* was supplemented during the period of low water by that of two parties equipped with tools, explosives, tackle, etc., as follows:

A force of laborers upon U. S. quarter boat *No. 5*, under Overseer Daniel B. Nailer, commenced work July 1 at Fulton, Ark., and continued downstream to Shreveport, La., 183 miles, reaching the latter place December 20, 1907, where the quarter boat was laid up to undergo repairs during the period of high water.

The following obstructions to navigation were destroyed by this party:

Channel snags cut and destroyed	3,869
Logs in channel destroyed	52
Jams broken up and destroyed	8
Side jams broken up and destroyed	29
Leaning trees felled and cut up	13,074
Shore snags cut and destroyed	13,060

October 8 to 21 an old barge, purchased in 1906 for use at Rattling Slough, was fitted up at Shreveport, La., for use as U. S. quarter boat *No. 9*, and the party placed thereon worked from Shreveport downstream to Lake End, La., 105.4 miles, operations having been suspended at the latter place December 21, 1907, by high water, and the boat was towed back to Shreveport and laid up. This work was performed under the supervision of Overseer Charles P. Chenette to November 13, 1907, and of Overseer James N. Ferguson after that date, the following being a summary of what was done:

Channel snags cut and destroyed	238
Logs removed from channel	49
Stumps removed from channel	44
Side jams broken up and destroyed	3
Leaning trees felled and cut up	2,060
Shore snags cut and destroyed	2,690
Stumps cut and destroyed	328
Logs cut up and destroyed along banks	2,312

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During the period of high stages the plant was repaired at Shreveport, La. In December and January the boiler of the snag boat *Howell* was repaired, new smokestacks and breeching were erected, the machinery was overhauled, and minor repairs were made. Quarter boat *No. 5* was repaired and put in good condition for work during the low-water season and a new quarter boat was built.

AT ALEXANDRIA, LOUISIANA.

Work at this locality, under the project approved March 1, 1907, for repairing and strengthening the dikes (see report for 1907, p. 1495) was commenced September 9; was suspended November 9, 1907, by a rise of the river, and was performed under the local supervision of Overseer James N. Ferguson.

Sixty-nine carloads of stone, containing 2,578.35 tons of 2,000 pounds, were purchased for the purpose at Little Rock, Ark., at $1 per ton placed aboard the cars at that place. The cost of railway transportation to Alexandria (partly by land-grant road) amounted to $1,304.12. The commercial freight rate was 6 cents per hundred pounds. Thirty carloads of stone (1,142.3 tons) were used for strengthening the upper dike, and 39 carloads (1,436.05 tons) were used for repairing the lower dike and for grading and paving 19,500 square feet of bank (paved about 3½ cubic yards to 100 square feet of surface). Three hundred and forty logs, aggregating 6,922 linear feet, were purchased at Alexandria at 7½ cents per foot, and were used for repairing the cribs of the lower dike.

The upper dike now ranges in height from about 16 feet on the gauge at the bank to 10 feet at its outer end.

At the lower dike the top of the crib next to the bank has an elevation of about 16 feet, the next crib about 13 feet, and the others 10 feet on the Alexandria gauge. Seven cribs in the wing wall at its lower end were not raised, on account of the river rising over them before work was suspended.

Considerable fill has made behind both dikes, and they appear to be accomplishing the work expected.

The amounts expended during the year and the unexpended balances July 1, 1908, were as follows:

Allotments.	Expended during year.	Balances unexpended July 1, 1908.
General improvement	$40,177.68	$181,002.75
At Shreveport, La.		9,308.96
At Alexandria, La.	7,607.20	6,735.96
At Rattling Slough, La.		145.93
Total	47,784.88	197,193.60

The unexpended balances are to be applied to the purposes designated in the column of allotments. The estimate for the fiscal year 1910 is for maintenance of the improvement.

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Money statement.

July 1, 1907, balance unexpended	$244,978.48
June 30, 1908, amount expended during fiscal year for maintenance of improvement	47,784.88
July 1, 1908, balance unexpended	197,193.60
July 1, 1908, outstanding liabilities	4,368.88
July 1, 1908, balance available	192,824.72
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	75,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

The appropriations for early work, from 1828 to 1852, were as follows:

May 23, 1828	$25,000.00	March 3, 1841	$75,000.00
March 2, 1831	187.50	March 2, 1847	7,150.00
July 3, 1832	22,628.00	August 30, 1852	100,000.00
June 28, 1834	50,000.00		
March 3, 1835	50,000.00	Total	535,765.50
July 2, 1836	40,800.00 30,000.00	Amount expended	532,219.90
March 3, 1837	65,000.00	Amount carried to surplus fund	3,545.60
April 20, 1838	70,000.00		

The appropriations since 1872 have been as follows:

June 10, 1872	$20,000 150,000	August 2, 1882	$75,000
March 3, 1873	80,000	July 5, 1884	75,000
June 23, 1874	50,000	August 5, 1886	75,000
March 3, 1875	20,000	August 11, 1888	65,000 35,000
August 14, 1876	35,000	September 19, 1890	100,000 28,000
April 10, 1869	[a] 4,500	July 13, 1892	145,000
February 7, 1878	6,000	August 18, 1894	150,000
June 18, 1878	24,000 25,000	June 3, 1896	100,000
March 3, 1879	15,000 22,500 10,000	March 3, 1899	150,000
		June 13, 1902	125,000
		March 3, 1905	100,000
June 14, 1880	25,000 60,000 10,000	March 2, 1907	150,000
		Total	1,950,000
March 3, 1881	10,000 10,000		

Receipts from sales	$5,416.97
Refundments of overpayments	43.11

COMMERCIAL STATISTICS.

List of boats engaged in the Red River trade during the fiscal year.

Name.	Tonnage.	Draft. Light.	Draft. Loaded.	Between—	Round trips.
		Feet.	Feet.		
Wm. Porter	76	1.5	3.5	Shreveport and Alexandria, La. Shreveport, La., Fulton, Ark., and various points.	2 7
Wm. Partee	50	1.5	3.3	Shreveport, La., and Garland, Ark.	10

[a] Allotment made August 27, 1877, from appropriation for examinations, surveys, and contingencies of rivers and harbors, for closing Tones Bayou.

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Summary of commerce reported.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Cotton	76	$20,320	Provisions	88	$5,500
Cotton seed	3,813	61,000	Grain	100	3,125
Live stock	82	4,920	Miscellaneous	10,046	13,000
Lumber	498	4,375	Saw logs	21,650	86,000
			Total	36,288	198,240

W 2.

IMPROVEMENT OF OUACHITA AND BLACK RIVERS, ARKANSAS AND LOUISIANA.

GENERAL IMPROVEMENT.

August 6 to 10 U. S. quarter boat *No. 6* was towed from Monroe, La., upstream 72 miles to the mouth of Saline River, Arkansas, where active operations were commenced August 12 by a party equipped with tools, tackle, explosives, etc. Work of this party was carried downstream 44.4 miles to the mouth of Bayou Bartholomew, Louisiana, and the force was transferred to that stream September 26, 1907. Foreman Edward A. Hollingsworth was in charge of the party, and the following obstructions to navigation of Ouachita River were removed:

Channel snags cut and destroyed	844
Logs removed from channel	25
Side jams broken up and destroyed	17
Shore snags cut	225
Logs cut up and destroyed	668
Leaning trees felled and cut up	2,280
Stumps cut and destroyed	363
Trees girdled	57
Square yards of willows and brush cut	11,700
Wreck destroyed (sunken barge)	1

A second force of laborers was organized at Monroe, La., August 11, and equipped with tools, tackle, and explosives on U. S. quarter boat *No. 3*. August 13 to 22 the boat was moved downstream 59 miles to Columbia, La., where work commenced the latter date. Operations were carried downstream 68.4 miles to Jonesville, La., and on November 1, 1907, the party was transferred to Tensas River. Overseer John B. Bres, jr., was in charge of the force until September 14 and Foreman John M. Cowan after that date. The following is a summary of the work performed:

Channel snags cut and destroyed	1,431
Logs removed from channel	520
Side jams broken up and destroyed	2
Shore snags cut and destroyed	5,250
Logs cut up and destroyed	1,927
Leaning trees felled and cut up	4,316
Trees girdled	17
Square yards of willows and brush cut	637
Wrecks destroyed (sunken flatboats)	3

U. S. quarter boat *No. 7* and a force of laborers were transferred from Bayou D'Arbonne to Ouachita River September 1, and during the three months following work was carried downstream 108.1 miles to the mouth of Boeuf River. December 1, 1907, the party was transferred to Boeuf River. The force was in charge of Overseer

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Houston H. Burns until October 16 and of Foreman Carlous E. M. Henry after that date. The following is a summary of the work performed:

Channel snags cut and destroyed	1,613
Logs cut up and destroyed	768
Side jams broken up and destroyed	1
Shore snags cut and destroyed	6,573
Leaning trees felled and cut up	834
Trees girdled	538

After the suspension of operations by high water, the plant was assembled at Jonesville, La., where necessary repairs were made. The hull of quarter boat *No. 3* was renewed and a new quarter boat was built.

The new steel snag boat *Jos. E. Ransdell*, built under contract of April 2, 1906, with Ed. J. Howard, of Jeffersonville, Ind., was delivered at Vicksburg, Miss., on May 30, 1908. This snag boat is supplied with an outfit for dredging with an orange-peel bucket, in addition to the usual outfit for snagging. In command of J. W. Baxter, master, the boat was sent into Red River for thirty days' trial.

Mr. Robert Elflein, former master of the U. S. snag boat *C. W. Howell*, was the inspector of work performed under the contract.

LOCKS AND DAMS NOS. 4 AND 6.

Contract work at Lock No. 4, near Monroe, La., was resumed August 27 at a stage of 3.43 feet above low water, and was continued until November 23, 1907, when a rise of the river flooded the cofferdam. During this period construction work consisted of excavation for the lock core wall and abutment wall, driving foundation piles and permanent sheet piling for these walls, and placing concrete in the core and land walls of the lock. Continued high stages have prevented any work since.

At Lock No. 6, near Roland Raft, Ark., the contractors commenced driving piles for the lock cofferdam early in August, and continued work upon this structure until the flood in November. The only construction work performed under the contract consisted of driving foundation piles for the river wall and for the river side of the lock floor above the line of axis; 619 piles were driven in October, 1907; total penetration, 10,678 feet, and average penetration below cut-off, 17.25 feet.

Payments on the contract for the two locks and dams during the year were as follows:

Lock and Dam No. 4.

Construction work:		
Foundation piles (driven), 4,051 linear feet, at 25 cents		$1,012.75
Sheet piling, 5,552 linear feet, at 65 cents		3,608.80
Excavated material, 1,976.9 cubic yards, at 75 cents		1,482.68
Framed timber, 3,220 feet B. M., at $30 per 1,000 feet		96.60
Portland cement concrete, 1,232.8 cubic yards, at $7.50		9,246.00
Bolts, special irons, etc., 710 pounds, at 8 cents		56.80
Cast iron, 471 pounds, at 8½ cents		40.03
Structural steel, 1,058 pounds, at 10½ cents		111.09
		15,654.75
Less 10 per cent reserved	$1,565.47	
Less previous payments for material delivered	4,668.33	
		6,233.80
Amount paid		9,420.95

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Material delivered:		
Structural steel, 345,926 pounds, at 4 cents		$13,837.04
Cast iron, 6,522 pounds, at 4 cents		260.88
Sprocket chain, 950 pounds, at 7 cents		66.50
Cast iron pipes, 20 inches diameter, 99 linear feet, at $3		297.00
		14,461.42
Less 10 per cent reserved		1,446.14
Amount paid		13,015.28
Total amount paid		22,436.23

Lock and Dam No. 6.

Construction work:		
Foundation piles (driven), 10,678 linear feet, at 30 cents		$3,203.40
Less 10 per cent reserved	$320.34	
Less previous payments for material delivered	918.00	
		1,238.34
Amount paid		1,965.06
Material delivered:		
Gravel for concrete, 2,400 cubic yards, at 75 cents		1,800.00
Less 10 per cent reserved		180.00
Amount paid		1,620.00
Total amount paid		3,585.06

LOCKS AND DAMS NOS. 2 AND 8.

Borings and a survey at the site of Lock No. 8, Franklin shoals, Arkansas, were completed July 6, after which the boring plant was moved downstream 224.5 miles to Harrisonburg, La. Borings and a local survey were made at the originally proposed site of Lock No. 2, about ½ mile below Harrisonburg, after which the plant was moved upstream to the hill lands about ½ mile above Harrisonburg, La., where eight borings and an alternative survey were made, and the boundaries of land required were run out. The survey was extended downstream to a junction with the survey of the first site, the two giving the river bed from the alternative site to deep water below Harrisonburg bar. This work was completed August 23.

In making the borings at the site below Harrisonburg flowing quicksand was encountered, which made the location impracticable. Those made ½ mile above Harrisonburg showed a hard blue clay uniformly underlying the whole site, and the best foundation that has been found on this river. Dredging to obtain a channel below, with 65 feet bottom width and 6½ feet depth at low water, amounts to 26,000 cubic yards, which is estimated to cost $6,500. The construction of Lock and Dam No. 2 at this site will render Lock and Dam No. 1 unnecessary—the net saving being approximately $275,000. The change of location was recommended by the district engineer and by the division engineer after visting the locality, and was authorized by the Chief of Engineers November 9, 1907.

Plans and specifications for the construction of Lock and Dam No. 2 have been submitted and were approved by the Chief of Engi-

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neers April 21, 1908. This work is being advertised with a view to construction by contract, the date for opening bids being July 13, 1908.

Proposals for building Lock and Dam No. 8 were invited by newspaper advertisement from August 5 to October 5, 1907, but only one bid was received, aggregating the total sum of $488,713.32 (based upon the estimates of quantities on which the bids were canvassed), and under authority of the Chief of Engineers dated October 19, 1907, this bid was rejected as excessive. The execution of the work by hired labor and purchase of materials was authorized the same date.

During the period of high water plant was constructed and assembled for dredging sand and gravel and delivering it at the lock site. Lumber, piling, iron, etc., for cofferdam, foundations, a construction camp, etc., coal, derricks, hoisting engines, and other machinery and plant required were purchased and towed to the lock site.

High water submerges the banks for miles around and it was necessary that the mound provided for in the approved plans be constructed with the least practicable delay in order to take advantage of the low-water season of 1908, but an obstacle was encountered in procuring title to the land. An agreement, however, was executed by the reputed owner of the land required for the mound under which the Department could take possession of and occupy the land at once, payment therefor to be made when the condemnation proceedings instituted were concluded, and this agreement was approved by the Acting Secretary of War December 16, 1907. Construction of the mound was commenced immediately after the approval was granted, and the work on the mound was practically completed at the end of the fiscal year. The necessary preparations have now been made for prosecuting the construction work actively at Lock and Dam No. 8 by day labor to the fullest extent possible during the approaching low-water season.

The amounts expended during the year and the unexpended balances July 1, 1908, were as follows:

Allotments.	Expended during year.	Balances unexpended July 1, 1908.
Maintenance of improvement	$12,883.41	$25,762.39
Dredging at Catahoula Shoals		10,000.00
Building snag boat	9,678.23	24,977.54
Completion of survey	278.70	
Locks and Dams Nos. 4 and 6	28,511.78	329,648.72
Locks and Dams Nos. 2 and 8	109,161.04	273,856.86
Total	160,508.16	664,245.11

The balances are to be applied to the purposes designated above in the column of allotments.

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Money statement.

July 1, 1907, balance unexpended		$599,724.87
Amount received from sales of property		28.40
Amount appropriated by Sundry civil act approved May 27, 1908		225,000.00
		824,753.27
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$137,672.82	
For constructing snag boat	9,673.23	
For maintenance of improvement	12,883.41	
For survey	278.70	
		160,508.16
July 1, 1908, balance unexpended		664,245.11
July 1, 1908, outstanding liabilities		31,860.60
July 1, 1908, balance available		632,384.51
July 1, 1908, amount covered by uncompleted contracts		372,026.43
Amount (estimated) required for completion of existing project		[a] 470,135.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	[b] $478,135.00	
For maintenance of improvement	40,000.00	
		518,135.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

The appropriations have been as follows:

March 3, 1871	$25,000	June 3, 1896	$70,000
March 3, 1871	26,000	March 3, 1899	110,000
June 10, 1872	60,000	June 13, 1902	31,500
June 10, 1872	40,000	June 13, 1902	80,000
March 3, 1873	60,000	March 3, 1903	250,000
August 14, 1876	12,000	March 3, 1905 (river and harbor act)	80,000
June 18, 1878	10,000	March 3, 1905 (sundry civil act)	12,000
March 3, 1879	10,000	June 30, 1906 (sundry civil act)	91,954
June 14, 1880	8,000	March 2, 1907 (river and harbor act)	200,780
March 3, 1881	12,000	May 27, 1908 (sundry civil act)	225,000
August 2, 1882	12,000		
July 5, 1884	15,000	Total	1,583,734
August 5, 1886	17,500		
August 11, 1888	20,000		
September 19, 1890	15,000		
July 13, 1892	40,000		
August 18, 1894	50,000		

Receipts from sales	$1,572.61
Refundments of overpayments	145.35

[a] The estimate for completion refers only to that part of the project authorized by Congress for construction of Locks and Dams Nos. 2, 4, 6, and 8, at a cost of $1,289,869.

[b] Includes amount required for completion of Locks and Dams Nos. 2, 4, 6, and 8 of existing project as previously estimated, $176,135; increased estimate of cost of Locks and Dams Nos. 2 and 8, $294,000; and estimate for cost of surveys, tests, etc., at the sites of locks and dams in projects other than those for which funds are provided, $8,000.

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CONTRACT IN FORCE.

Name of contractor: Chicago Engineering and Constructing Company.
Character of work: Construction of Locks and Dams Nos. 4 and 6, Ouachita River, Louisiana and Arkansas.
Date of original contract: September 7, 1904. Supplementary contracts dated April 24 and September 6, 1905.
Date of approval of original contract: September 26, 1904.
Supplementary contracts approved: June 14 and September 26, 1905.
Date of beginning work: October 28, 1904.
Date contract expires: Time limit waived.

Details and prices.

Classification.	Approximate quantities.		Unit prices.	
	No. 4.	No. 6.	No. 4.	No. 6.
Lock keeper's dwellings.....number..	1	1	$4,800.00	$4,800.00
Maneuvering boats.....do....	1	1	3,500.00	3,500.00
Valves for 20-inch pipe.....do....	4	4	200.00	200.00
Winches.....do....	2	2	125.00	125.00
Grubbing and clearing.....acres..	½	1½	200.00	200.00
Excavated material.....cubic yards..	7,219	14,816	.75	.75
Portland cement concrete.....do....	15,830	11,943	7.50	8.00
Gravel filling.....do....	1,000	1,000	1.50	1.50
Back fill and embankment.....do....	9,795	7,200	.60	.60
Concrete paving.....square yards..	3,140	1,570	2.00	2.00
Miter sills, posts, etc. (oak).....feet B. M..	8,852	8,268	[a] 50.00	[a] 50.00
Framed timber (including drum and drum chamber).....feet B. M..	15,714	15,014	[a] 30.00	[a] 30.00
Needles.....do....	22,159	21,214	[a] 60.00	[a] 60.00
Sheet piling.....linear feet..	37,755	24,582	.65	.65
Foundation piles (driven).....do....	83,555	50,302	.25	.30
Drain pipe, 4-inch unglazed tile.....do....	500	500	.20	.20
Cast-iron pipe (20-inch diameter).....do....	97	74	6.50	6.50
Structural steel.....pounds..	295,312	278,778	.10½	.10½
Cast iron.....do....	64,306	58,522	.08½	.08½
Bolts, special irons, etc.....do....	9,000	9,000	.08	.08
Sprocket chain.....do....	2,700	2,700	.08	.08
Chain.....do....	2,200	1,900	.08½	.08½
Steel bars (1-inch).....do....	14,171	10,938	.06	.06
Riprap.....tons..	1,680	1,690	3.60	4.60
Mound embankment.....cubic yards..	.....	21,463	.....	.60

[a] Per 1,000 feet B. M.

COMMERCIAL STATISTICS.

List of boats in the Ouachita River trade during the fiscal year.

Name.	Class.	Tonnage.	Length.	Breadth.	Depth.	Draft.		Between—	Round trips.	Passengers.
						Light.	Loaded.			
			Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*			
Bob Blanks.....	Stern-wheel.	265	175.0	35.0	5.0	3.0	.....	New Orleans, Monroe, and way points.	43	2,943
Columbia.....	...do..	139	170.0	29.0	4.0	2.0	.....	New Orleans and Columbia.	40	1,842
Little Rufus.....	...do..	131	130.9	29.5	5.0	2.0	5.0	New Orleans and Monroe.	2	.....
Frank B. Hayne...	...do..	90	130.4	27.0	4.0	2.0	.....	New Orleans, Monroe, and way points.	12	.....
Edna [a] [b].....	...do..	78	70.0	21.4	3.0	1.9	3.0	Monroe and Ouachita City.	26	.....
Handy.....	...do..	49	110.0	22.0	3.0	2.0	.....	Monroe and Camden ...	25	125
M. F. Bradford....	...do..	46	82.0	15.2	3.6	1.8	3.0	Alto and Staffords	3	.....
Virginia [b].....	.....	43	.....	.....	.....	1.0	.....	Jonesville and Eldorado Landing.	11	43
Lillian May	.....	14	.....	.....	.....	1.8	.....			
Welcome	Gasoline.	14	61.0	14.0	2.3	1.1	.....	Monroe and way points.	20	49
Clara P	...do..	13	57.0	13.0	2.3	1.5	.....	Baton Rouge and Boeuf River.	.....	.....
Nymph	.....	5	.....	.....	.....	3.0	4.0	Monroe and Camden....	.....	.....

[a] Towboat. [b] With one or more barges.

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Summary of commerce reported.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Cotton	16,025	$4,272,880	Provisions	7,808	$520,520
Cotton seed	5,212	88,373	Grain	2,814	87,895
Hides and skins	26	10,220	Miscellaneous	16,279	656,881
Live stock	459	27,510	Saw logs	96,446	254,860
Lumber	8,955	39,500			
Staves	8,102	97,208	Total	157,126	6,050,842

W 3.

IMPROVEMENT OF BAYOU BARTHOLOMEW, BOEUF RIVER, TENSAS RIVER AND BAYOU MAÇON, AND BAYOUS D'ARBONNE AND CORNEY, LOUISIANA.

Operations in these tributaries of Ouachita River during the fiscal year ending June 30, 1908, were continued under the local supervision of Mr. H. M. Marshall, assistant engineer, as follows:

(A) BAYOU BARTHOLOMEW.

U. S. quarter boat *No. 6* was transferred from Ouachita River to this stream September 26, 1907, and work for the maintenance of its improvement was continued until January 11, 1908. Operations were carried from the mouth upstream to McComb Landing, Ark., 141 miles, and thence back to the upper end of Ross Bend, La., 13 miles above the mouth. Work was suspended by high water January 12. Foreman Hollingsworth was succeeded by Foreman Seiburn R. Goodrum November 9, 1907.

The following is a summary of the work performed:

Channel snags cut and destroyed	794
Jam broken up and destroyed	1
Side jam broken up and destroyed	1
Logs removed from channel	288
Shore snags cut up and destroyed	246
Logs cut up and destroyed	284
Leaning trees felled and cut up	3,550
Stumps cut and destroyed	254
Trees girdled	526
Square yards of willows and brush cut	1,475

Money statement.

July 1, 1907, balance unexpended	$5,412.56
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,392.07
July 1, 1908, balance unexpended	2,020.49
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	4,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

(B) BOEUF RIVER.

The force of laborers upon U. S. quarter boat *No. 7*, under Foreman Henry, was transferred from Ouachita River to this stream and

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December 1 to 3, 1907, worked from the mouth upstream 6 miles to Smith Ford, La., removing the following obstructions to navigation:

Channel snags cut and destroyed	71
Shore snags cut	262
Leaning trees felled and cut up	14
Stumps cut and destroyed	61
Logs destroyed	7

At the close of work December 3 the party was laid off on account of a rise of the river.

With reference to the outlet to Boeuf River near Point Jefferson, La., attention is invited to the Annual Report of the Chief of Engineers for 1907, pages 1502 and 1503. The conditions as there stated still exist at this locality, and the necessity for closing the outlet continues. The recommendation for an appropriation of $30,000 is therefore renewed.

Money statement.

July 1, 1907, balance unexpended	$5,642.77
June 30, 1908, amount expended during fiscal year for maintenance of improvement	124.18
July 1, 1908, balance unexpended	5,518.59
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	34,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

(c) TENSAS RIVER AND BAYOU MAÇON.

The party on U. S. quarter boat *No. 3*, under Foreman Cowan, was transferred from Ouachita River to Tensas River November 1, 1907, and November 1 to 15 worked up the latter stream 8¾ miles to a point ¾ mile above Chamberlin Bar, and removed the following obstructions to navigation:

Channel snags cut and destroyed	415
Shore snags cut and destroyed	883
Logs cut up and destroyed	634
Leaning trees felled and cut up	241

The quarter boat struck a snag and sank November 15. Heavy rains and a rise of about 8 feet prevented raising it at once; but this was done by the U. S. snag boat *C. W. Howell* December 10, 1907, and the boat was towed to Tensas Point on Ouachita River, Louisiana, and laid up.

Money statement.

July 1, 1907, balance unexpended	$5,102.14
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1,189.15
July 1, 1908, balance unexpended	3,912.99
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

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(D) BAYOUS D'ARBONNE AND CORNEY.

A party on U. S. quarter boat *No. 7*, under Overseer Houston H. Burns, commenced work in Bayou d'Arbonne at Farmerville, La., July 8 and carried it downstream 43.7 miles to Ouachita River, reaching the latter point August 31. The quarter boat and party were transferred to the improvement of Ouachita River September 1, 1907. A jam of drift near Farmerville was broken up January 6 and 7, 1908.

The following work was performed during the year:

Channel snags cut and destroyed	289
Logs removed from channel	540
Jams broken up and destroyed	2
Shore snags cut	1,237
Leaning trees felled and cut up	677
Stumps cut and destroyed	706
Trees girdled	8
Square yards of willows and brush cut	22,340
Wreck removed (old steamboat hull, name unknown)	1

Money statement.

July 1, 1907, balance unexpended	$2,067.39
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1,942.34
July 1, 1908, balance unexpended	125.05
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	2,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

The appropriations for the improvement of these streams have been as follows:

By act of—	Bayou Bartholomew.	Boeuf River.	Tensas River and Bayou Maçon.	Bayous D'Arbonne and Corney.	Total.
March 3, 1881	$8,000	$5,000	$3,000	.....	$16,000
August 2, 1882	5,000	5,000	.....	.....	10,000
July 5, 1884	5,000	5,000	4,000	$5,000	19,000
August 5, 1886	5,000	5,000	4,000	2,000	16,000
August 11, 1888	5,000	6,000	5,000	2,000	18,000
September 19, 1890	5,000	5,000	5,000	2,000	17,000
July 13, 1892	5,000	10,000	5,000	4,000	24,000
August 18, 1894	5,000	8,000	5,000	[a]2,000	20,000
June 3, 1896	4,000	6,000	5,000	.....	15,000
March 3, 1899	5,000	6,000	4,000	.....	15,000
June 13, 1902 (allotments July 26, 1902)[b]	5,000	3,500	4,000	2,500	15,000
March 3, 1905 (allotments April 7, 1905)[c]	5,000	900	9,500	1,600	17,000
March 2, 1907 (allotments March 20, 1907)	5,000	5,000	5,000	2,000	17,000
Total amount appropriated	67,000	70,400	58,500	23,100	219,000

[a] Act of August 18, 1894, also appropriated $1,000 for Little D'Arbonne.

[b] The original allotments of appropriations of June 13, 1902, authorized July 26, 1902, were $5,000 for Boeuf River and $2,500 for Tensas River and Bayou Maçon. October 23, 1903, a transfer of $1,500 from Boeuf River to Tensas River and Bayou Maçon was authorized.

[c] The original allotments of appropriation of March 3, 1905, authorized April 7, 1905, were $5,000 for Boeuf River, $5,000 for Tensas River and Bayou Maçon, and $2,000 for Bayous D'Arbonne and Corney. January 4, 1906, a transfer of $3,700 from Boeuf River to Tensas River and Bayou Maçon was authorized, and December 8, 1906, transfers of $400 from Boeuf River and $400 from Bayous D'Arbonne and Corney to Tensas River and Bayou Maçon were authorized.

Refundment of overpayments (Boeuf River), $32.45.

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COMMERCIAL STATISTICS.

BAYOU BARTHOLOMEW.

List of boats engaged in the trade during the fiscal year.

Name.	Class.	Tonnage.	Length.	Breadth.	Depth.	Draft.		Between—	Round trips.	Passengers.
						Light.	Loaded.			
			Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*			
Handy ..	Sternwheel...	49	110	22	3.0	2.0	.....	Monroe and various points...	....	....

Summary of commerce reported.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Cotton	102	$13,920	Saw logs	4,000	$10,000
Cotton seed	46	742			
Provisions	3	190	Total	4,152	24,987
Miscellaneous	1	85			

BOUEF RIVER.

List of boats engaged in the trade during the fiscal year.

Name.	Class.	Tonnage.	Length.	Breadth.	Depth.	Draft.		Between—	Round trips.	Passengers.
						Light.	Loaded.			
			Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*			
Control	Sternwheel...	108	118.5	27.4	4.6	.....	.....	Not reported	.....	....
M. F. Bradford	.....do.....	46	82.0	15.2	3.6	1.8	3.0	Mouth and various points.	27	....
Lillian May[a]	.....	14	.....	.....	.....	1.8	.....	Not reported	.....	....
Clara P[a]	Gasoline.....	13	57.0	12.0	2.3	1.5	.....	Mouth and Charleyville.	2	....

[a] With one or more barges.

Summary of commerce reported.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Cotton	258	$68,800	Staves	1,838	$19,260
Cotton seed	608	9,740	Provisions	33	21,570
Hides and skins	1	100	Grain	24	750
Live stock	25	1,500			
Lumber	125	1,250	Total	2,912	122,960

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TENSAS RIVER AND BAYOU MAÇON.

List of boats engaged in the trade during the fiscal year.

Name.	Class	Tonnage.	Length.	Breadth.	Depth.	Draft.		Between—	Round trips.	Passengers.
						Light.	Loaded.			
			Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*			
Concordia	Stern wheel	156	152.0	36.6	6.0	1.2	5.0	Jonesville and various points.	40	....
Jewell	.....	32	.....	.....	.....	1.5	3.0	.....do	52	....
Alice	.....	.....	.....	.....	.....	1.3	4.0	.....do	17	....

Summary of commerce reported.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Cotton	2,160	$576,000	Grain	872	$27,250
Cotton seed	5,813	66,000	Miscellaneous	174	11,500
Lumber	85	850	Saw logs	60	150
Staves	250	3,000			
Provisions	4,695	313,000	Total	14,109	997,750

BAYOUS D'ARBONNE AND CORNEY.

List of boats engaged in the trade during the fiscal year.

Control.—No information given concerning class, tonnage, etc., and none available.

Summary of commerce reported.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Cotton	45	$12,000	Grain	58	$1,753
Cotton seed	24	357	Miscellaneous	48	2,680
Lumber	48	475	Saw logs	15	36
Staves	1,434	14,405			
Provisions	64	4,235	Total	1,736	35,971

W 4.

IMPROVEMENT OF MOUTH OF YAZOO RIVER AND HARBOR AT VICKSBURG, MISSISSIPPI.

The chief work performed during the fiscal year ending June 30, 1908, was that required for maintenance of West Pass levee, and consisted of cutting and burning the weeds and grass, planting willows to protect exposed stretches from wave wash, repairing and strengthening the wooden bulkheads, repairing damages from wave wash, and removing drift from the terraces.

Sunday, January 19, 1908, a fire in the grass was communicated to the timber protection bulkheads on the river side of the levee, damaging them for a distance of about 1,000 feet. As soon as dis-

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covered a force of laborers was hired and the fire was extinguished. The damaged section was cleared away and was repaired in February. As a safeguard, the grass was cut away from the foot and tops of the bulkheads.

Slope gauge readings were continued during the year.

The bulkheaded terraces have furnished satisfactory protection against wave wash, but the bulkheads are now badly decayed in places and can not be expected to serve their purpose for more than a year longer. The willow growth on the river side of the levee now furnishes a fairly efficient protection against wave wash to the south slope of the levee up to the foot of the top bulkhead, but tree culture has only been moderately successful on the lake side of the levee and can not be relied upon for protection against wave wash except for a limited portion of the lowest bulkhead on that side of the levee. Consequently the decay of the bulkheads on the lake side of the levee will leave vertical faces of earth exposed to heavy wave wash.

In order to provide for the maintenance of the levee against this wave wash it is recommended that the bulkheads on the lake side, which have now served their purpose, be removed and that the levee slope be brought to a uniform grade and then be paved with riprap on a bed of gravel. It is estimated that the cost of this work will be $40,000. In addition, the sum of $4,000 is required for surveys.

October 1 to 26 a survey was made from the head of the diversion canal in Old River to the Mississippi River, and a survey also was made of the left side of the Mississippi River fronting West Pass levee. The canal survey showed the following depths for a 12-foot stage on the gauge at Kleinston: Old River, 13.4 feet; main cut, 24.1 feet, and Vicksburg Harbor division, 29.4 feet. The minimum depths in the above stretches were 10.6 feet near head of the canal in Old River, 13.6 feet at lower end of main cut, and 25 feet at mouth of the canal. A comparison with the survey of November and December, 1906, showed some scour in Old River, scour in general through the main cut, and fill with one exception through the Vicksburg Harbor division. The average fill through the latter stretch was 4.1 feet, with a maximum of 8 feet near the Peoples Compress and a minimum of 0.5 foot at mouth of the canal. The canal channel everywhere was well below the original grade, except for stretches of 4,000 feet in Old River and 200 feet at foot of the main cut.

Money statement.

July 1, 1907, balance unexpended	$11,839.06
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,994.35
July 1, 1908, balance unexpended	7,844.71
July 1, 1908, outstanding liabilities	652.46
July 1, 1908, balance available	7,192.25
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	44,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

PREVIOUS PROJECTS.

[Harbor and Mississippi River at Vicksburg, Miss., and revetment work at Delta Point, La.]

June 18, 1878	$84,000.00
March 3, 1879	50,000.00
June 14, 1880	20,000.00
March 3, 1881	75,000.00
Allotments by Mississippi River Commission	603,210.85
	832,210.85
Expended for work at—	
Vicksburg Harbor	442,724.77
Delta Point	389,486.08
	832,210.85

EXISTING PROJECT.

July 13, 1892	$75,000
August 18, 1894	225,000
August 18, 1894	40,000
June 4, 1897	350,000
March 3, 1901	510,000
Total	1,200,000

W 5.

IMPROVEMENT OF YAZOO, TALLAHATCHIE, COLDWATER, AND BIG SUNFLOWER RIVERS, AND TCHULA LAKE, MISSISSIPPI.

Operations for maintenance of the improvement of Yazoo River and tributaries were continued during the fiscal year ending June 30, 1908, under the local supervision of Mr. H. M. Marshall, assistant engineer, as follows:

(A) YAZOO RIVER.

The U. S. snag boat *Columbia*, James H. Bobbs, master and overseer, was employed in Yazoo River from July 11 to August 4, and August 11 to November 29, 1907. Operations extended from the mouth to the head of the river, and the following work was performed:

Snags pulled	1,447
Stumps pulled	462
Shore snags cut	827
Leaning trees felled and cut up	10,780
Stumps cut and destroyed	194
Square yards of willows and brush cut	450
Brush wing dam built at head of Honey Island	1
Wrecks removed (part of steamer *Paul Pry*, sunk during civil war near mouth of Big Sunflower River; part of steamer *Hallette* at Yazoo City, and sunken barge in bend above Welch Camp)	3

The new steel snag boat *Ben Humphreys*, built under contract at Jeffersonville, Ind., was delivered at Vicksburg, Miss., on May 30, 1908. This snag boat is supplied with an outfit for dredging, with an orange-peel bucket, in addition to the usual outfit for snagging.

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The *Humphreys*, in command of J. H. Bobbs, master, left Vicksburg June 9, proceeded up Yazoo River to its head, and removed the following obstructions to navigation:

Snags pulled	7
Trees removed from slides and cut up	16

Tests of the dredge bucket were made at the mouth of the Yallabusha River, but the bottom channel of the boom broke, and the boom was taken to Greenwood to be shipped to the contractor.

Money statement.

July 1, 1907, balance unexpended		$88,009.95
June 30, 1908, amount expended during fiscal year:		
For constructing snag boat	$11,472.11	
For maintenance of improvement	11,478.66	
		22,950.77
July 1, 1908, balance unexpended		65,059.18
July 1, 1908, outstanding liabilities		9,421.62
July 1, 1908, balance available		55,637.56
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		30,000.00

(B) TALLAHATCHIE AND COLDWATER RIVERS.

From August 5 to 10 the snag boat *Columbia* worked in Tallahatchie River between its mouth and Minter City, removing obstructions, chiefly tree slides, which prevented navigation at low stages, the following being a summary of what was done:

Snags pulled	151
Stumps pulled	2
Shore snags cut	14
Leaning trees felled and cut up	321

From September 8 to December 16, 1907, the force of laborers upon the U. S. quarter boat *No. 8*, under Foreman John W. Kline, jr., worked down Tallahatchie River from the mouth of Coldwater River to a point about 10 miles above Greenwood, and removed the following obstructions to navigation:

Logs removed from channel	444
Side jams broken up and destroyed	13
Shore snags cut	1,503
Leaning trees felled and cut up	9,636
Stumps cut and destroyed	2,671
Logs destroyed	162
Square yards of willows and brush cut	64,158

The new snag boat *Ben Humphreys* commenced work at mouth of Tallahatchie River June 26, 1908, and at close of the month operations had extended upstream to Minter City, the following obstructions having been removed:

Snags pulled	39
Stumps pulled	3
Trees removed from channel and cut up	33

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Money statement.

July 1, 1907, balance unexpended	$5,523.24
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	3,111.35
July 1, 1908, balance unexpended	2,411.89
July 1, 1908, outstanding liabilities	173.35
July 1, 1908, balance available	2,238.54
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

(C) TALLAHATCHIE RIVER, BETWEEN BATESVILLE AND THE MOUTH OF COLDWATER RIVER.

The work which commenced at Batesville May 27, 1907, by a force of laborers upon U. S. quarter boat *No. 8*, under Overseer John W. Kline, jr. (see report for 1907, p. 1510), was continued downstream about 43 miles to the mouth of Coldwater River and reached that point September 7, 1907.

The following is a summary of what was done:

Logs removed from channel	158
Side jams broken up and destroyed	2
Shore snags cut	1,180
Leaning trees felled and cut up	5,225
Stumps cut and destroyed	1,206
Logs destroyed	517
Square yards of willows and brush cut	33,200

Money statement.

July 1, 1907, balance unexpended	$3,144.63
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	2,969.52
July 1, 1908, balance unexpended	175.11
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

(D) BIG SUNFLOWER RIVER.

U. S. quarter boat *No. 2* and a derrick boat with a force of laborers under Mr. John W. Baxter, master and pilot, were towed from Vicksburg up Big Sunflower River to Baird the early part of July by United States steamers, which could proceed no farther on the low stages. From July 21 to August 21 the quarter and derrick boats were cordeled upstream to the mouth of Hushpuckena River, removing the worst obstructions on the way. From August 22, 1907, to January 18, 1908, this party worked downstream from the mouth of

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Hushpuckena River to Herd Landing, about 80 miles, operations having been suspended the latter date by high stages.

The following is a summary of the work performed:

Snags pulled and destroyed	1,014
Stumps pulled and destroyed	404
Logs removed from channel	1,681
Side jam broken up and destroyed	1
Shore snags cut	1,512
Leaning trees felled and cut up	24,179
Trees girdled	3,291
Square yards of willows and brush cut	1,000
Wing dam built (at Eastland shoals, 80 feet long)	1
Wrecks removed (gasoline boat near Lombard Ferry and 3 sunken flatboats)	4

A survey was made in July and August, 1907, for the purpose of locating levees to close chutes in lower Big Sunflower River. Bids for constructing the levees were invited by advertisement September 3 to 24, 1907, but none were received. A proposal of O. A. Gibson, levee contractor, to close the chutes at a price of 27 cents per cubic yard, was received October 24, and, under authority of the Chief of Engineers, a contract with him was entered into November 12, approved December 9, 1907, and requiring completion by December 31, 1908.

The work commenced January 6, and its condition June 30, 1908, was as follows:

Name of levee.	Estimated contents.	Cubic yards in place.
	Cubic yds.	
American Chute	13,900	2,000
Little Sunflower	24,200	.....
Howlett Bayou	10,600	.....
Nine and Ten Mile bayous	43,100	5,115
Six Mile Bayou	24,500	.....
Total	116,300	7,115

Money statement.

July 1, 1907, balance unexpended	$101,362.56
June 30, 1908, amount expended during fiscal year for maintenance of improvement	15,883.88
July 1, 1908, balance unexpended	85,478.68
July 1, 1908, outstanding liabilities	2,141.47
July 1, 1908, balance available	83,337.21
July 1, 1908, amount covered by uncompleted contracts	80,915.00

(E) TCHULA LAKE.

No work was done in Tchula Lake during the year.

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Money statement.

July 1, 1907, balance unexpended	$4,290.65
July 1, 1908, balance unexpended	4,290.65
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

By act of—	Yazoo River.	Tallahatchie and Coldwater rivers.	Big Sunflower River.	Tchula Lake.	Total.
March 3, 1873	$40,000				$40,000
March 3, 1875	12,000				12,000
August 14, 1876	15,000				15,000
June 18, 1878	25,000				25,000
March 3, 1879	15,000	$13,000	$20,000		48,000
June 14, 1880	12,000	13,000	8,000		33,000
March 3, 1881	6,000	3,000	4,000	$3,000	16,000
August 2, 1882	8,000	3,000	5,000	2,500	18,500
July 5, 1884	10,000	3,000	5,000	1,500	19,500
August 5, 1886	15,000	3,500	5,000	2,000	25,500
August 11, 1888	32,000	5,000	5,000	3,000	45,000
September 19, 1890	25,000	5,000	5,000	3,000	38,000
July 13, 1892	20,000	5,000	5,000	3,000	33,000
August 18, 1894	20,000	4,000	5,000	3,000	32,000
June 3, 1896	20,000	4,000	5,000		29,000
March 3, 1899	20,000	5,000	5,000		30,000
June 13, 1902 (allotments July 30, 1902)	21,000	10,000	20,000	4,000	55,000
March 3, 1905 (allotments April 7, 1905[a])	85,000	10,000	6,000	4,000	105,000
March 2, 1907[b]	36,000	9,000	100,000	4,000	149,000
Total amount appropriated	437,000	95,500	208,000	33,000	768,500

[a] The original allotments of appropriation of March 3, 1905, authorized April 7, 1905, were $90,000 for Yazoo River and snag boat and $5,000 for Tallahatchie and Coldwater rivers. July 12, 1906, a transfer of $5,000 from Yazoo River to Tallahatchie and Coldwater rivers was authorized.

[b] The river and harbor act of March 2, 1907, made specific appropriation of $100,000 for Big Sunflower River and $4,000 for Tallahatchie River above mouth of Coldwater River to Batesville. The following allotments for maintenance were authorized March 20, 1907: Yazoo River $36,000, Tallahatchie and Coldwater rivers $5,000, and Tchula Lake $4,000.

Receipts from sales (Yazoo River)	$110.46
Refundment of overpayment (Tallahatchie River)	.04

CONTRACT IN FORCE.

Name of contractor: O. A. Gibson.
Character of work: About 116,300 cubic yards of levee embankment for closing chutes of lower Big Sunflower River.
Price per cubic yard: 27 cents.
Date of contract: November 12, 1907.
Date of approval: December 9, 1907.
Date of beginning work: January 6, 1908.
Date contract expires: December 31, 1908.

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COMMERCIAL STATISTICS.

YAZOO RIVER.

List of boats engaged in the trade during the fiscal year.

Name.	Class.	Tonnage.	Length.	Breadth.	Depth.	Draft. Light.	Draft. Loaded.	Between—	Round trips.	Passengers.
			Feet.	Feet.	Feet.	Feet.	Feet.			
Henry Sheldon	Stern wheel	220	159.0	29.0	3.9	1.8	3.5	Greenwood and Vicksburg.	40	786
Little Rufus	do	131	130.9	29.5						
Osage [a b]	do	98	100.0	19.8	3.8	2.0	2.5	Vicksburg and L'Argent.	20	
Addie T. [a]	do	97	112.6	24.8	3.8	1.5	3.5	Vicksburg and Greenwood.	39	
Frank B. Hayne	do	90	130.4	27.0	4.0	2.0	4.0	Vicksburg and Minter City.	2	4,000
Alice B. Miller [c]	do	90				2.0	4.0	do	9	
Fountain City [b]	do	65	99.5	23.5	4.3	2.0	4.0	Vicksburg and Satartia.	22	
Sam A. Connor [a]	do	63	96.5	16.0	2.6	1.8	2.2	Vicksburg and L'Argent.	40	
Imogen	do	51	77.5	17.0	4.2	1.0	3.0	Greenwood and Belzona.	24	
Fawn [a b]	do	46	95.0	18.5	3.3	2.5	3.2	Vicksburg and L'Argent.	40	
Monarch [a]	Tug	43	71.2	14.3	3.4			Belzona and various points.		
Black Hawk [a b]	do	34	80.0	15.0	5.8			Vicksburg and Belchers.		
Tempest [a b]	do	24	74.4	13.2	6.0			do		
J. B. Butts	Gasoline	15	84.0	15.0	2.8	1.2	2.0	Yazoo City and various points.	34	
Lola M	do	8	45.0	13.5	3.8	1.5	2.0	Vicksburg and Adams Landing.	5	

[a] Towboat. [b] With one or more barges. [c] Formerly the Frank B. Hayne.

Summary of commerce reported.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Cotton	4,139	$1,102,400	Provisions	6,177	$411,825
Cotton seed	9,769	101,217	Grain	7,381	230,645
Hides and skins	17	6,720	Miscellaneous	19,659	430,324
Live stock	256	15,360	Saw logs	22,000	33,000
Lumber	1,286	12,858			
Staves	2,517	301,980	Total	73,201	2,646,329

TALLAHATCHIE AND COLDWATER RIVERS.

List of boats engaged in the trade during the fiscal year.

Name.	Class.	Tonnage.	Length.	Breadth.	Depth.	Draft. Light.	Draft. Loaded.	Between—	Round trips.	Passengers.
			Feet.	Feet.	Feet.	Feet.	Feet.			
Choctaw [a]	Stern Wheel	223	127.0	24.0	4.0	1.7	3.5	Greenwood and various points.	84	
Choctaw		100						Not reported		
J. A. Townes [a]		97						Greenwood and Minter City.	30	
Admiral Schley	Propeller	3				3.5	3.5	Rich and Neels Ferry.	7	

[a] With one or more barges.

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Summary of commerce reported.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Cotton	6,412	$1,709,840	Grain	32	$1,000
Cotton seed	9,732	150,900	Miscellaneous	4,560	304,000
Hides and skins	21	8,200	Saw logs	2,400	6,000
Live stock	275	16,500			
Lumber	2,000	20,000	Total	25,432	2,216,440

BIG SUNFLOWER RIVER.

List of boats engaged in the trade during the fiscal year.

Name.	Class.	Tonnage.	Length.	Breadth.	Depth.	Draft.		Between—	Round trips.	Passengers.
						Light.	Loaded.			
			Feet.	Feet.	Feet.	Feet.	Feet.			
Osage [a b]	Stern wheel	98	100.0	19.8	3.8	2.0	2.5	Vicksburg and Murphys.	20	....
Sam A. Connor [a b]	do	63	98.5	16.0	2.6	1.8	2.2	do	40	....
Peerless [b]	do	50	100.0	20.0	4.0	1.2	2.5	Vicksburg and Woodburn and Burchs	50 2	715
Fawn [a b]	do	46	95.0	18.5	3.3	....	....	Vicksburg and Murphys.	40	....
Will H. Wood	Tug	44	72.2	16.6	7.6	....	....	Vicksburg and Lake George.	4	....
J. B. Butts	Gasoline	15	84.0	15.0	2.8	1.2	2.0	Yazoo City and Holly Bluff.	34	....
C. R. Hull [b]	do	9	65.0	12.8	2.0	1.3	....	Vicksburg and Woodburn.	87	222

[a] Towboat. [b] With one or more barges.

Summary of commerce reported.

Articles.	Tons.	Value.	Articles.	Tons.	Value.
Cotton	3,904	$1,040,880	Provisions	1,459	$97,260
Cotton seed	4,386	66,595	Grain	3,072	141,000
Hides and skins	7	2,500	Saw logs	118,500	385,970
Live stock	158	9,480	Miscellaneous	3,117	84,300
Lumber	7,464	74,635			
Staves	113	1,350	Total	142,180	1,908,970

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APPENDIX X.

IMPROVEMENT OF RIVERS AND HARBORS IN THE LITTLE ROCK, ARKANSAS, DISTRICT.

REPORT OF CAPT. WILLIAM D. CONNOR, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Arkansas River, Arkansas.
2. White River, Arkansas.
3. Arkansas River at Pine Bluff and White River at Augusta Narrows, Arkansas.
4. Upper White River, Arkansas.
5. Operating and care of Locks and Dams Nos. 1, 2, and 3, upper White River, Arkansas.
6. Cache River, Arkansas.
7. Black and Current rivers, Arkansas and Missouri.
8. St. Francis and L'Anguille rivers, Arkansas.

ENGINEER OFFICE, UNITED STATES ARMY,
Little Rock, Ark., July 14, 1908.

SIR: I have the honor to forward herewith annual reports for the fiscal year ending June 30, 1908, for the works of improvement under my charge. * * *

Very respectfully, your obedient servant,

WM. D. CONNOR,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

XI.

IMPROVEMENT OF THE ARKANSAS RIVER, ARKANSAS.

OPERATIONS THIS FISCAL YEAR.

Snagging operations.—The snag boats *Arkansas* and *Reese* were both in commission and working between Little Rock and the mouth of the river at the first of the year. The *Arkansas* ceased snagging operations for the season of 1907 at Keatts (163.5 R.), December 24, and laid up for the winter at Little Rock December 31, 1907. The *C. B. Reese* ceased active operations at Fourche (159 R.) on January 29, 1908, and laid up temporarily at that point on account of low water. The boat reached Little Rock and was laid up for the season with the *Arkansas* February 8, 1908. Both snag boats left Little Rock for the present season's work on May 23, 1908, but owing to unexpected and prolonged high waters since that date have been laid up at Pine Bluff to await a more suitable working stage.

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Both boats were repaired while in winter quarters, the principal repairs being: To the *Arkansas*, hull scraped and painted inside, cabin painted inside, chimneys and boiler casing repaired, all machinery thoroughly overhauled, new boiler-feed water heater installed, exhaust pipes moved back to stern of boat, and new roof put on pilot house; to the *C. B. Reese*, put on new rudder to replace one lost on Keatts Crossing in January, 1908, cut 6 inches off of the bottom of the other two rudders, thoroughly overhauled propelling and capstan engines, and put in new exhaust pipe, scraped and painted hull inside and painted outside of hull above water, painted dining room, kitchen, and deck room.

Summary of snagging operations in Arkansas River, fiscal year 1908.

Date.	Snag boat.	Work done between—	Distance.	Snags removed.	Trees cut.	Drifts broken.	Miles run.
1907.			*Miles.*				
July	Arkansas	Plum Bayou and Old Samples.	78	152	1,301	.....	188
Do	C. B. Reese	Cut-off and Swan Lake	72	129	792	1	226
August	Arkansas	Eatons and Fletchers Cut-off.	19	253	863	.....	74
Do	C. B. Reese	Arkansas Post and Swan Lake.	44	307	292	.....	76
September	Arkansas	Millers Point and Fletchers Cut-off.	4	267	1,681	1	15
Do	C. B. Reese	Cut-off and Swan Lake	72	282	47	.....	77
October	Arkansas	Fletchers Cut-off and Poverty Point.	138	304	342	1	135
November	Arkansas	Medford and Adamsburg	98	198	780	.....	132
December	Arkansas	Adamsburg and Little Rock	47	166	608	.....	56
Do	C. B. Reese	Poverty Point and Douglas	53	140	.....	.....	149
1908.							
January	C. B. Reese	Cummins and Fourche	90	121	548	2	139
May	Arkansas	Little Rock and Olives	36	.....	741	.....	44
Do	C. B. Reese	Little Rock and Pine Bluff	65	.....	.....	.....	65
Total	.....	Poverty Point and Little Rock.	166	2,314	7,995	5	1,433

During the summer and fall of 1907 Fletchers Cut-off, 27 to 30 miles below Little Rock, became navigable, and the boats now use the cut-off entirely. This leaves Wampoo, one of the oldest landings on the river, nearly 2 miles from the low-water channel.

The shoalest water during the year in the river below Pine Bluff was reported September 16, 1907, when there was but 28 inches on the crossing at Silver Lake (43), but the river was at a fair boating stage during this fiscal year. In the vicinity of Little Rock, Peach Orchard (171) and Little Maumelle (182) gave the most trouble during October, 1907.

Complaints having been made by the Muskogee-Oklahoma Packet Company and others that the railway bridges at Fort Smith (369), Holtz Rock (385.4), and the one just above Frozen Rock (459) were unreasonable obstructions to navigation, an investigation was made and a report rendered January 8, 1907, which resulted in the Department finding, March 13, 1907, that the high bridge of the Kansas City Southern Railway Company at Holtz Rock was not considered an unreasonable obstruction to navigation, and ordering a public hearing in the matter of the bridge of the St. Louis and San Francisco Railway Company at Frozen Rock, which has no draw span, although a low structure. The hearing on the latter bridge was held June 29, 1907, and on December 20, 1907, a supplementary hearing was held for a discussion of the question of the details of the alterations to be made in said bridge, a report on same being rendered Jan-

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uary 9, 1908. As the Missouri Pacific Railway Company had shown indications of an intention to construct the regulation works necessary to hold the channel through the present draw span of their bridge at Fort Smith (obstructed by sand bar, see Annual Report for 1905, p. 1565), a reasonable length of time was allowed them within which to obtain the necessary authority and to commence operations. Later, however, a public hearing was ordered and held in this office, June 9, 1908, and a report rendered thereon June 19, 1908.

The St. Louis Southwestern Railway Company has started construction of certain brush structures along the right bank above their Rob Roy Bridge (99) designed to keep the low-water channel through draw span, but it is not believed that any effective work has been done, recent soundings indicating that the channel will be found under the fixed spans when the present flood subsides.

Hydraulic dredging.—River and harbor act of June 12, 1902 made appropriation for operating hydraulic dredges in this river. The project for the expenditure of this fund is to make some experimental dredging with plant borrowed from the Mississippi River Commission before procuring plant for permanent use in this river.

At the close of the last fiscal year, the dredge *Gamma*, which had been loaned to this district by the Mississippi River Commission, was lying at Swan Lake waiting for the river to fall. The work done by the *Gamma* for the balance of the season was as follows:

July 10 to 14.—Moved down to Silver Lake (43).

July 15 to 19.—Working on Silver Lake crossing; dug a channel 2,450 feet long, 65 feet wide, and left a depth of 7 feet throughout the same on the 19th, with the Pine Bluff gauge reading 9¼ feet and the Little Rock gauge 6 feet.

July 20 to 21.—Moved down to Sandy Bayou (20).

July 22 to 24.—Worked on Sandy Bayou crossing; dug a channel 1,500 feet long, 120 feet wide, and 12 feet deep, Pine Bluff gauge 8.2, Little Rock 5.4 on July 24.

July 25 to August 5, 1907.—Returning dredge and auxiliaries to Memphis.

In May, 1908, the Mississippi River Commission again loaned to this district the dredge *Gamma*, the tenders *Nokomis* and *Venus*, and the necessary ponton pipe, with which to continue experimental dredging, the plant to be returned by August 1, 1908. The dredge left West Memphis May 10, 1908, and arrived at Victoria (95.5 R) in the Arkansas River on May 16, but owing to the long continued high water no dredging operations were possible until June 29, 1908, when the dredge commenced work at Rob Roy (99) with a double crew.

The funds available for dredging will be exhausted at the close of this season's work.

Unfortunately the longest flood on record in the Arkansas Valley has so far prevented dredging operations in the season of 1908, but the work done by the *Gamma* in this river below Pine Bluff during April, May, June, and July of 1907 was very satisfactory, and there is no reason to believe that the work of the present season will not be equally efficient.

In general terms we may describe the results of the dredging in 1907 as follows:

The dredge worked at seven crossings, six of which were bad and one of which (Hannaberry) was only fair when the dredge entered the river. Of these seven, the channels dredged have remained through the low-water season in five and have been obliterated in two (Pleasants, 73, and Silver Lake, 43). Wherever the location of the

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dredge cut was correct—that is, in the five above mentioned—the effects remained beneficial throughout the low-water season. The faulty location of the other two dredge cuts can be held responsible for the lack of results in the other two places.

The subject of dredging in the lower Arkansas has been fully discussed in the Annual Report of the Chief of Engineers for 1903 (pp. 1410 to 1415, inclusive). While the results obtained from dredging in this river during the season of 1907 are considered very encouraging, it is not believed that they are yet conclusive enough to warrant any definite recommendation as to future dredging operations in this river. After the results of the dredging during the present season have been observed and studied, definite recommendation can be made and will then be submitted.

Recently there has been a demand that snagging operations be resumed in the vicinity of and above Fort Smith (369), and it is hoped to afford some relief with a chopping party or other temporary outfit during the coming low-water season, but if snagging operations are to be continued in this section of the river it will be necessary to construct a light-draft boat for that purpose, as the two snag boats now in use in the lower river are of too deep draft for operations above Fort Smith and have not time to devote to that work. It is believed that the proposed boat should have a steel hull, and such a boat would cost approximately $30,000 and would require for maintenance and for operating five months each year the sum of $8,500 annually.

The balance available July 1, 1908, will be expended in snagging operations and in dredging. The amount estimated as being needed during the fiscal year ending June 30, 1910, is for maintenance of channel by snagging operations.

Money statement.

July 1, 1907, balance unexpended	$96,751.25
Refundment of overpayments	11.80
	96,763.05
June 30, 1908, amount expended during fiscal year for maintenance of improvement	43,365.20
July 1, 1908, balance unexpended	53,397.85
July 1, 1908, outstanding liabilities	13,678.12
July 1, 1908, balance available	39,719.73
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	73,500.00

APPROPRIATIONS.

July 3, 1832: For improving the navigation of the Arkansas River, Arkansas, Indian Territory, and Kansas (less $38 carried to surplus fund)	$14,962.00
March 3, 1835: For improving the navigation of the Arkansas River	40,000.00
March 3, 1837: For continuing the works	25,000.00
July 7, 1838: For the improvement of the Arkansas River (less $1,155.66 carried to the surplus fund)	38,884.34
From appropriations 1842–1844 (estimate)	80,000.00

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August 30, 1852: For the improvement of the Arkansas River (less $269.47 carried to surplus fund)	$39,730.53
From appropriations 1866–1878 (disbursements reported by Colonel Suter)	344,831.59
April 14, 1876: For removing the bar at Fort Smith, Ark	10,000.00
June 18, 1878: For removing the bar in the Arkansas River at Fort Smith	10,000.00
March 3, 1879:	
For improvement of Arkansas River between Fort Smith, Ark., and Wichita, Kans	20,000.00
For removing snags and bars, wrecks, and other obstructions, and correcting and deepening the channel * * * on the Arkansas River	30,000.00
June 14, 1880:	
For improvement of Arkansas River between Fort Smith, Ark., and Wichita, Kans	15,000.00
For improving Arkansas River at Pine Bluff, Ark	25,000.00
For removing snags, wrecks, and other obstructions * * * on the Arkansas River	35,000.00
March 3, 1881:	
For improving Arkansas River between Fort Smith, Ark., and Wichita, Kans	24,000.00
For improving Arkansas River at Pine Bluff, Ark	23,000.00
For improving the Arkansas River	25,000.00
August 2, 1882:	
Continuing improvement between Fort Smith, Ark., and Wichita, Kans	20,000.00
Continuing improvement at Pine Bluff, Ark	20,000.00
Continuing removal of snags, wrecks, * * * from the Arkansas River	35,000.00
July 5, 1884:	
For survey of the Arkansas River from Little Rock to the mouth	19,000.00
Improving Arkansas River at Pine Bluff, Ark	55,500.00
For removing obstructions in Arkansas River from its mouth to Wichita, Kans	36,000.00
For the protection of the harbor at Fort Smith, Ark	5,000.00
August 5, 1886:	
Continuing improvement, according to plan and recommendation in Appendix V 13, Executive Document No. 1, Forty-ninth Congress	75,000.00
For the removal of snags, wrecks, and other obstructions	19,875.00
August 11, 1888:	
Continuing improvement * * * between Wichita, Kans., and the navigable mouth of the Arkansas River	150,000.00
For removing obstructions	25,000.00
September 19, 1890:	
Continuing improvement from Wichita, Kans	180,000.00
For operating snag boats and removing obstructions	20,000.00
July 13, 1892:	
Improving Arkansas River, Arkansas and Indian Territory	250,000.00
Removing obstructions and operating snag boats	20,000.00
August 18, 1894:	
Continuing improvement ($10,000 may be used in removing obstructions and operating snag boats)	250,000.00
Removing obstructions and operating snag boats	20,000.00
June 3, 1896:	
Continuing improvement ($15,000 may be used in removing obstructions and operating snag boats)	100,000.00
Removing obstructions and operating snag boats	20,000.00
March 3, 1899:	
Continuing improvement ($50,000 may be used in removing snags, sand bars, and other obstructions)	100,000.00
Removing obstructions and operating snag boats	20,000.00
June 13, 1902: Continuing improvement and for maintenance, including the general improvement, and removing obstructions and operating snag boats	110,000.00

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March 3, 1905:	
For maintenance of improvement	$35,000.00
For revetment work in vicinity of Red Fork, provided it is required in the interest of navigation	30,000.00
March 2, 1907:	
For maintenance of improvement	35,000.00
And the amounts heretofore appropriated to be expended in the vicinity of Red Fork levee or set apart for dredging are hereby made available for the maintenance of this improvement.	
Total appropriations	2,450,783.46
September 15, 1900: Allotted from emergency river and harbor act June 6, 1900, for repairs to Red Fork revetment	10,000.00
June 7, 1904: Allotted from emergency river and harbor act approved April 28, 1904	20,000.00
February 18, 1905: Allotted from emergency river and harbor act approved April 28, 1904	[a]504.41
Receipts from sales in fiscal year 1907	23.70
Refundment of overpayments in fiscal year 1908	11.80
Total appropriations, allotments, receipts from sales, and refundments of overpayments	2,481,320.37

EXPENDITURES.

For removing obstructions and operating snag boats	$1,167,053.08
For hydraulic dredging	22,968.37
For original construction of works for permanent improvement, including survey of river from Little Rock to the mouth	903,311.93
For maintenance of works for permanent improvement	334,589.14
Total expended to June 30, 1908	2,427,922.52
Unexpended July 1, 1908	53,397.85
	2,481,320.37

COMMERCIAL STATISTICS.

List of vessels that navigated Arkansas River from May 31, 1907, to June 1, 1908.

Name.	Net tonnage.	Draft loaded. Steamers.	Draft loaded. Barges.	Between—	Round trips.	Passengers.
		Ft. in.	*Ft. in.*			
A. D. Allen	86	4 6	2 6	Little Rock and Pine Bluff, Shoal Creek and mouth.	30	298
Mary C. Lucas	52	3 0	3 0	McClean Bottom and Dardanelle	2	85
				Shoal Creek and Little Rock	1	
				Dardanelle and Little Rock	6	
				Little Rock and Eagle Landing	28	
				Little Rock and Cummins	5	
				Pine Bluff and Rosedale	2	
Border City[b]	27	2 6	.....	Webbers Falls and Fort Smith	10	.....
J. N. Harbin	142	3 0	.....	Memphis and Pine Bluff	35	1,199
Lucille Nowland	298	5 0	.....	do	14	208
Jim T. Duffy, jr	97	5 0	5 0	Barging ties out of lower river	3	.....
C. M. Johnson	41	3 6	5 0	Barging timber out of lower river	20	.....
Eagle	188	4 6	5 0	do	2	.....
Birmingham	187	5 0	6 0	do	1	.....
H. C. Brockman	75	3 6	.....	Towing barges and rafts out of lower river.	20	.....
Jewel	49	(?)	.....	do	(?)	.....
Hazel Rice	101	3 0	5 0	do	11	.....
David Neal[b]	6	1 4	1 4	Towing brush for railway bank protection at Garland Lake and Rob Roy.	250	.....

[a] $1,000 less than $498.59 not used and returned to Treasury.
[b] Gasoline boats. All others steamboats.

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Classification of commerce reported year ending May 31, 1908.

Articles.	Tons.	Articles.	Tons.
Cotton	4,344	Saw logs	63,929
Cotton seed	6,035	Railway ties	3,845
Live stock	362	Miscellaneous	4,185
Lumber	10,393	Total tonnage reported	103,919
Staves	1,506		
Stave bolts	2,682	Estimated value	$2,150,269
Provisions	3,967		
Grain	2,721		

X 2.

IMPROVEMENT OF WHITE RIVER, ARKANSAS.

OPERATIONS THIS FISCAL YEAR.

The snag boat *Quapaw* worked in the river between Black Island (266) and Andrews Landing (163) from October 1 to November 15, 1907, when the boat was laid up at Newport. The snag boat *C. B. Reese* entered this river October 1, working from the cut-off (8) to mouth of Little Red (182.5) until November 30, 1907, when the boat left the river. Various repairs were made to the *Quapaw* while lying at Newport and the most important were the following: The propelling and capstan machinery were completely overhauled, the main engine cylinders being rebored, and the valve stems replaced; new foot blocks were placed under shear legs on snagging deck; a new foundation was placed under the port capstan engine, the furnace was rebuilt; a new roof put on, and the entire boat was painted.

Summary of work done by the snag boats Quapaw and C. B. Reese in White River.

Boat.	Work done between—	Distance.	Snags removed.	Trees cut.	Drifts broken.	Miles run.
		Miles.				
Quapaw	Black Island and Andrews Landing	103	245	285	2	288
C. B. Reese	Mouth of Cut-off and mouth of Little Red.	175	322	666	2	602
Total	Both boats	258	567	951	4	890

Owing to the fact that the $7,500 which has heretofore been reserved pending an examination of a purported threatened cut-off near De Vall Bluff (125 R) has been made available for maintenance of channel by snagging operations, the $6,600 estimated in last annual report for maintenance of channel to June 30, 1909, will not be needed, and the balance available July 1, 1908, will be used for and is sufficient to operate and maintain snag boats until June 30, 1909. The hull of the *Quapaw* is getting soft and will need extensive repairs during the fiscal year 1910, estimated to cost $3,500. The amount estimated as being needed during the fiscal year ending June 30, 1910, is for maintenance and operation of snag boats.

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Money statement.

July 1, 1907, balance unexpended	$28,940.75
Refundment of overpayment	.10
	28,940.85
June 30, 1908, amount expended during fiscal year for maintenance of improvement	10,908.98
July 1, 1908, balance unexpended	18,031.87
July 1, 1908, outstanding liabilities	783.39
July 1, 1908, balance available	17,248.48
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	16,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Appropriations for this river have been partly for limited reaches, partly for the whole river, and partly for this river in combination with others.

The appropriations for this river separately and for reaches of it are as follows:

June 23, 1874	$50,000.00
August 14, 1876	10,000.00
March 3, 1879	10,000.00
June 14, 1880	20,000.00
June 14, 1880	5,000.00
March 3, 1881	8,000.00
August 2, 1882	6,000.00
August 2, 1882	4,000.00
July 5, 1884	35,000.00
August 5, 1886	18,000.00
August 11, 1888	25,000.00
September 19, 1890	30,000.00
July 13, 1892	75,000.00
August 18, 1894	52,000.00
June 3, 1896	22,000.00
March 3, 1899	14,815.00
June 13, 1902	22,000.00
May 31, 1904, allotted from appropriation for maintenance of river and harbor improvement, act of June 13, 1902	$7,100.00
March 3, 1905	15,000.00
March 2, 1907	30,000.00
Total appropriations and allotments	458,915.00
Receipts from sales, fiscal year 1907	12.10
Refundment of overpayment, fiscal year 1908	.10
Total	458,927.20

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COMMERCIAL STATISTICS.

The river was at a fair boating stage all the year. Full report of commerce was not received.

List of vessels that navigated White River, Arkansas, from May 31, 1907, to June 1, 1908.

Name.	Net tonnage.	Draft loaded. Steamer.		Barge.		Between—	Round trips.	Passengers.
		Ft.	in.	Ft.	in.			
Maud Kilgore	82	3	0	6	0	Augusta and St. Charles	120	
Miriam	65	3	6			Beaver Island and Wild Goose Bayou	27	75
Alda	73	3	6	5	0	Clarendon and Log yards	40	115
Hazel Rice	101	3	0	5	0	White River Landing and Helena	9	
Choctaw	44	3	0	4	6	Oil Trough and Newport	1	
						Newport and mouth Little Red	1	
						Newport and Humphreys mill	2	
Roy	49	2	6	3	0	Jacksonport and Augusta	16	
Pocahontas	35	2	4	4	0	Newport and Augusta	2	
						Newport and Rhodes Mill	30	
						Newport and Oil Trough	3	
Jim. T. Duffy, jr	97	5	0	5	0	Mouth Little Red to mouth White	5	
Russell Lord	186	6	6	5	0	Casco to mouth	4	
Minnehaha	46	3	0	5	0	Augusta to Newport		
Geo. Pope	97	3	0	5	0	....do	10	
Dolphin No. 3	355	4	0	6	0	Cut-off and mouth	8	
Starr	43	2	6	5	0	Augusta and Jacksonport	28	
Katie Mc	41	2	2	4	0	Clarendon and Log yards	43	
Rock City	64	2	2	4	6	De Valls Bluff and Log yards	88	
Peerless[a]	13	1	8	2	6	Clarendon and Rosedale	42	61
						Newport and Grand Glaize	25	
Leader[a]	6	1	4	3	0	Newport and Augusta	10	
						Newport and Jacksonport	10	
						Newport and Oil Trough	10	
R. C[a]	7	3	0			Newport and Negro Hill	10	50

[a] Gasoline power boats. All others steamboats.

Classification of commerce reported year ending May 31, 1908.

Articles.	Tons.	Articles.	Tons.
Cotton	639	Railway ties	27,893
Cotton seed	360	Mussel shells	2,580
Lumber	11,950	Miscellaneous	175
Staves	1,210		
Provisions	1,655	Total tonnage reported	161,246
Grain	265		
Saw logs	114,519	Estimated value	$962,508

X 3.

IMPROVEMENT OF ARKANSAS RIVER AT PINE BLUFF AND OF WHITE RIVER AT AUGUSTA NARROWS, ARKANSAS.

In pursuance of the recommendation of the Board of Engineers, provided for in river and harbor act of March 2, 1907, and appointed to make, among others, an examination of the Arkansas River at Pine Bluff and of the White River at Augusta Narrows, a project was submitted, dated August 14, 1907, for the construction of a levee along Vaugine Neck, opposite Pine Bluff, on the Arkansas River, at

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an estimated cost of $50,000, and for a revetment and levee at Augusta Narrows on White River, at an estimated cost of $28,500.

At Pine Bluff.—Bids for approximately 248,000 cubic yards of levee work were opened at this office November 16, 1907, and a contract, dated January 4, 1908, was entered into with Lowrance Brothers & Leonard. The right of way for the levee is being donated to the United States, but up to the date of this report the Department of Justice has not approved the titles to the lands necessary for the right of way.

At Augusta Narrows.—The work at this point consists in a standard levee 3,500 feet in length along the neck in the narrows and of 1,800 linear feet of bank protection, in which the mattress is 60 feet wide and of the woven type commonly used on the Arkansas River, and the bank is to be graded and paved with stone to the top on a slope of 1 on 2. Bids for the levee work were opened September 18, 1907, but all the bids were rejected as too high. Subsequently a contract, dated October 15, 1907, for this work was made under verbal agreement with H. Dalhoff at a price of 24 cents per cubic yard for embankment and $100 per acre for clearing. Under this contract the levee is 80 per cent completed.

Bids for the revetment work were sent out August 29, 1907, but the only response received was rejected as excessive, and the work is being done by hired labor. In December, 1907, four barges from Batesville and the snag boat *Quapaw*, from Newport, were sent to this work, and later a quarter boat was also brought down from Batesville.

The plant was returned to Batesville in February, 1908, when work was suspended on account of high water, the party having placed 1,800 linear feet of 60-foot mattress and unloaded from cars 4,752 tons of stone. The revetment will be completed during the coming low-water season.

The balance on hand July 1, 1908, with the exception of the $21,500 reserved, will be applied to completing the work as outlined in the project.

Money statement.

July 1, 1907, balance unexpended	$100,000.00
Refundment of overpayment	1.00
	100,001.00
June 30, 1908, amount expended during fiscal year for works of improvement	19,410.68
July 1, 1908, balance unexpended	80,590.32
July 1, 1908, outstanding liabilities	1,770.91
July 1, 1908, balance available	78,819.41
July 1, 1908, amount covered by uncompleted contracts	52,276.77

APPROPRIATIONS.

March 2, 1907, improving Arkansas River at Pine Bluff and White River at Augusta Narrows, Arkansas	$100,000

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CONTRACTS IN FORCE.

Name and address of contractor.	Nature of contract.	Rate.	Contract approved.	Work began.	Expiration of contract.
H. Dalhoff, Little Rock, Ark.	Construct about 45,000 cubic yards of earth levee work.	24 cents a cubic yard.	(a)	Nov. 4, 1907	Extended for reasonable period.
	Clear about 4 acres of land.	$100 per acre..			
Lowrance Bros. & Leonard, Memphis, Tenn.	Construct about 248,000 cubic yards of levee work.	18.23 cents a cubic yard.	Feb. 24, 1908	(b)	Dec. 31, 1908.
	Clear about 20 acres of land.	$75 per acre...			

[a] Emergency; no approval.
[b] Land titles still under consideration by the Department of Justice.

COMMERCIAL STATISTICS.

(See reports for Arkansas and White rivers.)

X 4.

IMPROVEMENT OF UPPER WHITE RIVER, ARKANSAS.

OPERATIONS THIS FISCAL YEAR.

During this fiscal year the construction of Lock and Dam No. 3 was completed, the lock being placed under the indefinite appropriation for operating and care of canals, etc., on February 1, 1908.

Main dam.—This structure rests on rock, which is generally 6 feet below the level of pool No. 2. Excavation for the foundation of the dam was commenced June 20, 1907, and was continued whenever the dredge could be spared from other work, and was completed September 11, 1907. Forty feet of the dam next to the abutment was in place at the close of the last fiscal year and completed to the height of the apron. Framing and placing of timbers was begun on the balance of the dam July 31 and completed December 11, 1907, the pool being filled to the top of the dam by 4 p. m. December 18, 1907. The first section of dam built this season was 200 feet long and was placed and weighted next to the lock wall. The next section, 400 feet long, was built in place in the cut made through gravel bar by dredge on abutment side of river and adjoining the 40-foot section placed during the last fiscal year. The closing section was floated into position October 23, 1907. A Cail fishway was built in the dam near the abutment. The total length of the dam from the lock wall to the abutment is 750.7 feet, the average height is 21 feet, the lift 15 feet, and the style of construction is the same as the portions of Dams Nos. 1 and 2, resting on rock foundation. The dam is filled with 13,005 cubic yards of stone. A hydraulic ram was set in the dam next to the lock wall for the purpose of forcing water to the lock-house tank on a hill 175 feet above the dam.

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Abutment and levee.—In order to bring the top of the abutment up to the grade set for the levee which protects the swale in the field behind the abutment the concrete work was raised 3 feet in December, 1907, and properly back filled and paved. The west end of levee was also extended to the north side of the reservation to more fully protect the grounds.

Corner crib.—This crib, designed to prevent scour along the lower face of the abutment and in front of the abutment protection crib, was commenced last year and was completed and filled with 245 cubic yards of stone July 24, 1907. The joint between this crib and the abutment and its protection crib was grouted.

Lock gates, etc.—The framing of the lock gates was commenced on May 29 on the lock terreplein. The upper gates were hung August 1 and the lower on September 9, 1907. All valves, ladders, and other irons were in place by October 18, 1907.

Upper land crib.—The joints in the paving behind this crib, 238 square yards, were grouted with 1 to 3 cement mortar in December, 1907.

Lock terreplein.—At the close of the last fiscal year the lock terreplein, 1,550 square yards, had been paved back to the railway trestle. This year the joints were grouted with a 1 to 3 Portland cement mortar and the bank under the railway trestle was graded, paved, and grouted (486 square yards). The flat space between the railway trestle and the bluff, 590 square yards, was laid with riprap, which was covered with 75 cubic yards of gravel to prevent wash.

Lower land crib.—Crib construction commenced December 10, 1907. The foundation was dredged January 13 to 15, 1908, and the crib was filled with 644 cubic yards of stone and sunk by January 25, 1908. The gravel backfill was begun January 21 and was completed January 31, 1908, 868 cubic yards of gravel being used. The space behind this crib (275 square yards) was paved with stone, neatly laid, all joints of which were grouted with a 1 to 3 Portland-cement mortar.

Lower river crib.—The foundation was dredged November 26–27, 1907. Crib construction was commenced December 9, 1907, and completed February 8, 1908. This crib contains 1,153 cubic yards of one-man stone and is about 100 feet long. This length has proved to be too short, as the reaction around the lower end of the crib is so great that boats entering or leaving the lower lock approach are in danger of being seriously injured on the rocky shore below the lock at all times, except during low stages of the river. It is probable that if the crib was extended 75 feet down stream the eddy action would be greatly reduced.

Lock house, etc.—The lock tender's frame cottage was begun January 24, 1908, and completed May 10, 1908. A road was built from the county road to the site for the lock house on the bluff overlooking the river at Lock No. 3. The water supply is pumped by the hydraulic ram at the dam to a tank, which supplies water to the house. A cistern was also excavated. At the foot of the hill a two-room blacksmith shop and office building was erected and sheathed with sheet iron.

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General.—The temporary buildings and all material have been removed to Batesville and stored in the warehouse and shipyard. The floating plant is also being cared for and repaired at Batesville.

The small balance available will be reserved to assist in the construction of such new structures as experience may show to be necessary.

Money statement.

July 1, 1907, balance unexpended	$80,888.98
Refundment of overpayments, unclaimed wages and receipts from sales	281.45
	81,170.43
June 30, 1908, amount expended during fiscal year for works of improvement	[a] 76,528.79
July 1, 1908, balance unexpended	[b] 4,641.64
July 1, 1908, outstanding liabilities	1,865.50
July 1, 1908, balance available	2,776.14

APPROPRIATIONS.

March 3, 1899	$160,000.00
June 6, 1900	150,000.00
June 13, 1902	270,000.00
March 3, 1905	160,000.00
March 2, 1907	73,500.00
Receipts from sales, 1907	1.84
Refundment of overpayments, unclaimed wages, and receipts from sales	281.45
Total	$813,783.29

COMMERCIAL STATISTICS YEAR ENDING MAY 31, 1908.

The steamboat *G. W. Huff* and three barges entered the trade above Batesville during this fiscal year. The only other boat reporting navigating this part of White River this year was the gasoline boat *Angeline.*

Classification of commerce reported, year ending May 31, 1908.

Articles.	Tons.	Articles.	Tons.
Stave bolts	7,286	Miscellaneous	143
Wheel stocks	1,657	Mussel shells	33
Railroad ties	21,210	Total tonnage reported	34,614

Estimated value	$159,474
Number of passengers	1,086

[a] Lock and Dam No. 3.
[b] Lock No. 1, $214.50; Lock No. 2, $2,766.29; Lock No. 3, $1,660.85.

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X 5.

OPERATING AND CARE OF LOCKS AND DAMS NOS. 1, 2, AND 3, UPPER WHITE RIVER, ARKANSAS.

These locks and dams were built from funds derived from appropriations for Improving Upper White River, Arkansas. Lock and Dam No. 1 is situated 1 mile below Batesville, Ark., Lock No. 2 is 8 miles, and Lock No. 3 is 20 miles above Batesville. The three locks were placed under the indefinite appropriation for operating and care of canals, etc., as follows: Lock No. 1, January 16, 1904; Lock No. 2, February 16, 1905, and Lock No. 3, February 1, 1908.

OPERATIONS THIS FISCAL YEAR.

Lock and Dam No. 1.—In July, 1907, the wagon bridge over Ramsey Branch, connecting the lock grounds with the shipyard reservation, was given slight repairs. In October, 1907, the dam was rebacked in the vicinity of the old abutment with 250 cubic yards of one-man stone, and 27 cubic yards were also placed at junction of dam and lock wall, 15 cubic yards being placed above and 12 cubic yards below the dam. In November, 1907, about 360 square feet of bank paving was relaid below abutment, and in April, 1908, 1,262 square yards of the lock terreplein was cleaned, repaired, and joints grouted, the work extending 4 feet vertically up the slope on the bank behind the lock. About 200 square yards of the paving at the lower end was taken up, raised, and relaid. The outbuildings, lock house, and lock gates, etc., were painted and the lock was cared for and operated.

Lock and Dam No. 2.—At the close of the last fiscal year the work of repairing the damage done by the flood of May, 1907, was in progress, as outlined in last annual report. This work, together with the construction of the new apron cribs below the section of the dam on piles and alongside the lock walls, the partial refilling of the dam with raprap, and the protecting of the abutment and its timber extension with additional derrick stone, was completed December 31, 1907. From the lock pit 284 cubic yards of gravel were removed and 30 cubic yards of stone were placed behind the lower land crib. In a swale in the lock yard and in the levee 2,609 cubic yards of earth were placed, and 3,678 square yards of grouted and 833 square yards of plain paving were laid on lock terreplein and levee. The dam was repaired and refilled with 464 cubic yards of stone. In the new cribs alongside of lock wall and in repairs to corner crib 863 cubic yards of riprap were used as filling, and the cribs were decked with 134 cubic yards of gravel concrete. The new apron cribs below the section of dam on piles are 16 feet wide, 218 feet long, lap 8 feet on the section of dam on rock, contain 840 cubic yards of stone, and are founded on derrick stone placed in previous years, which was prepared for the crib foundation by the dipper dredge *Van Frank*. These apron cribs are decked with timber. At the abutment 15 cubic yards of large derrick stone were carefully placed in concrete mortar on the upper slope to prevent displacement of stones at this point.

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The abutment and its timber extension to the main bank was raised 3 feet, 146 cubic yards of clay, 40 cubic yards of riprap, and 372 cubic yards of derrick stone being used in the work. The freshet of May, 1907, besides depositing about 2,000 cubic yards of eroded material in the lock chamber, caused deposits below the lock to such an extent that the dipper dredge *Van Frank* was compelled to spend such time as could be spared from other work in dredging a harbor and channel below the lock. This work was done in September, October, and November, and resulted in leaving a harbor below the lock 150 feet wide and 350 feet long, with 10 feet depth at low stage, and a channel through the bar below, 1,450 feet long, 60 feet wide, and 6 feet deep at ordinary stage. The quantity removed was approximately 44,888 cubic yards of gravel. In the latter part of December, 1907, it became necessary to send the dredge to Maxwells shoal, 2 miles below Lock No. 2, where there was only 30 inches of water; 1,555 cubic yards of gravel were removed and a good though narrow channel made December 27–31, 1907.

In December, 1907, minor repairs were made to the lock walls, 6 barrels of cement being used. In January, 1908, all temporary buildings were removed, and in February a barn was built from the old material. One hundred feet of drain tile was laid from the house, and 230 cubic yards of earth were placed in a swale on the lock yard. Sixteen trees in the pool immediately above the lock were removed because they obstructed the entrance to the lock from above at certain stages of the river. The lock house, lock gates, and timber heads, etc., were kept painted and cared for.

Lock and Dam No. 3.—Although this lock did not come under this appropriation until February 1, 1908, it was used commercially as soon as the dam had raised the upper pool sufficiently for boats to pass the upper miter sill, which was December 12, 1907, since which date the lock has been in operation and properly cared for.

General.—On account of the unusual and even dangerous working conditions under which the repairs to Lock and Dam No. 2 had to be conducted, the floating plant required unusual repairs this fiscal year, a considerable portion of which is chargeable to this work. The principal repairs were: A new dipper handle was built on the dredge *Van Frank*, the dipper was repaired, the cabin thoroughly overhauled and new parts put in wherever necessary. Derrick boat *No. 2* was entirely rebuilt, except some bottom plank. The machinery of the towboat *Cleveland* was overhauled, her engines were rebored and relined, and her boiler connections were taken down preparatory to installing new boiler. Minor repairs were made to derrick boat *No. 1*, and the ten barges were repaired as needed.

When Lock and Dam No. 3 was completed, all the machinery and property were sent to the warehouse of the shipyard at Batesville, and in order to provide the storage room needed, the building was enlarged by boxing up, reroofing and flooring the temporary sheds formerly built on each side of the warehouse. The office building used during construction at Lock No. 3 was cut down in size and rebuilt on the shipyard reservation for a permanent headquarters office.

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ALLOTMENTS.

December 26, 1903, Lock and Dam No. 1	$800.00
June 22, 1904, Lock and Dam No. 1	3,701.00
February 10, 1905, Lock and Dam No. 2	1,095.00
June 28, 1905, Lock and Dam No. 2	4,850.00
July 7, 1905, Lock and Dam No. 2	30,000.00
July 13, 1905, Locks and Dams Nos. 1 and 2	8,094.00
July 13, 1906, Locks and Dams Nos. 1 and 2	23,479.00
May 29, 1907, Lock and Dam No. 2	3,200.00
Refundments of overpayments in fiscal year 1907	5.00
July 13, 1907, Locks and Dams Nos. 1 and 2	44,715.00
January 20, 1908, Lock and Dam No. 3	1,040.00
Refundment of unclaimed wages in fiscal year 1908	4.50
Total	120,783.50
Expended to June 30, 1908 $114,670.64	
Outstanding liabilities July 1, 1908 2,501.46	
	117,172.10
Available July 1, 1908	3,611.40

Summary of expenditures during the fiscal year ending June 30, 1908.

Items.	Amount.
Services	$21,875.83
Materials	13,845.65
Supplies	6,143.88
Property	899.68
General expense	503.81
Total expenditures this year	43,068.75
Expended in previous years	71,601.89
Total to June 30, 1908	114,670.64

COMMERCIAL STATISTICS YEAR ENDING MAY 31, 1908.

	Lock and Dam No. 1.	Lock and Dam No. 2.	Lock and Dam No. 3.
Lockages, number	249	661	126
Steam and gasoline boats, do	16	226	36
Barges (towed), houseboats, etc., do	72	366	45
Railway ties and logs (rafted), tons	13,627	13,077	1,944
Cooperage and wheelstocks (barged), do	119	8,824	2,378
Miscellaneous freights, do	.....	173	15
Estimated value of freights	$61,857	$110,052	$20,364
Number of passengers	27	1,066	156

X 6.

IMPROVEMENT OF CACHE RIVER, ARKANSAS.

OPERATIONS THIS FISCAL YEAR.

Nothing was done this fiscal year, the funds on hand being held for use in the fall of 1908, when an outfit can be secured from other works with which to prosecute the snagging operations, thus leaving the small amount appropriated for actual work.

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The balance available July 1, 1908, will be expended in working a small chopping party over the river below James Ferry, 79 miles above the mouth. The amount estimated as being necessary during the fiscal year ending June 30, 1910, is for maintenance of the channel below James Ferry by snagging operations.

Money statement.

July 1, 1907, balance unexpended	$2,000.00
July 1, 1908, balance unexpended	2,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	3,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS AND ALLOTMENTS.

August 18, 1888, mouth to Riverside	$7,000
July 13, 1892, mouth to Riverside	2,000
August 17, 1894, alloted from White River	2,000
June 3, 1896, alloted from White River	2,000
March 3, 1899, mouth to James Ferry	1,000
June 13, 1902, mouth to James Ferry	2,000
March 3, 1905, mouth to James Ferry	2,000
March 2, 1907, mouth to James Ferry	2,000
Total	20,000

COMMERCIAL STATISTICS.

The commerce reported for the year ending May 31, 1908, consisted of 18,012 tons of saw logs and 3,161 tons of railway ties, all of which were floated with the current.

X 7.

IMPROVEMENT OF BLACK AND CURRENT RIVERS, ARKANSAS AND MISSOURI.

These works were consolidated by river and harbor act of March 3, 1905, prior to which they had been provided for under separate appropriation titles.

OPERATIONS THIS FISCAL YEAR.

(A) BLACK RIVER.

The snag boat *Quapaw* worked over this river between the mouth and the mouth of Current River, 116 miles, during July and September, 1907. The hand-propelled snag boat *Riverside* worked the stream between Poplar Bluff (239) and the mouth of Current River (116) during July, August, November, and December of 1907, and in

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January, 1908, up to the 12th, when the boat met a rise at the head of Dan River (234), which necessitated the suspension of operations for the season. The boat was laid up at Poplar Bluff for the winter on January 15, 1908. Both boats will go into commission July 1, 1908.

Summary of work done by the snag boats Quapaw and Riverside in Black River.

Boat.	Work done between—	Distance.	Snags removed.	Trees cut.	Drifts broken.	Miles run.
		Miles.				
Quapaw.....	Mouth of Black and mouth of Current River.	116	435	1,040	29	269
Riverside.....	Mouth of Current and Poplar Bluff..	123	1,161	1,830	.....	258
Total, mouth of Black River to Poplar Bluff..		239	1,596	2,870	29	527

(B) CURRENT RIVER.

The snag boat *Quapaw* worked in this stream during August, 1907, between its mouth and the mouth of Little Black River (32), and the hand-propelled snag boat *Riverside* during September and October, 1907. The *Riverside* was towed from the mouth of the river up to the mouth of Little Black River (32), from which point it worked upstream to the Grandins Company's bridge, and thence back downstream to the mouth.

Summary of work done by the snag boats Quapaw and Riverside in Current River.

Boat.	Work done between—	Distance.	Snags removed.	Trees cut.	Drifts broken.	Miles run.
		Miles.				
Quapaw.....	Mouth and mouth of Little Black River.	32	261	390	10	212
Riverside.....	Mouth and 68 miles above.....	68	358	549	.....	103
	Total.....	68	619	939	10	315

The funds on hand July 1, 1908, will be applied to snagging operations needed during the fiscal year ending June 30, 1909, but are not sufficient to keep the snag boats in commission the entire season. The amount estimated as being needed during the fiscal year ending June 30, 1910, $18,000, is for maintenance of the channel by snagging operations.

Money statements.

BLACK RIVER.

July 1, 1907, balance unexpended	$12,343.15
June 30, 1908, amount expended during fiscal year for maintenance of improvement	6,322.73
July 1, 1908, balance unexpended	6,020.42
July 1, 1908, outstanding liabilities	230.73
July 1, 1908, balance available	5,789.69

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CURRENT RIVER.

July 1, 1907, balance unexpended	$5,020.15
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,062.99
July 1, 1908, balance unexpended	1,966.16
July 1, 1908, outstanding liabilities	64.00
July 1, 1908, balance available	1,902.16

BLACK AND CURRENT RIVERS.

Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	18,000.00

APPROPRIATIONS.

Appropriations for Black River have been made separately under the heads of "Improving Black River, Missouri," "Improving Black River, Arkansas," and "Improving Black River, Arkansas and Missouri." This river is understood not to have been included in the snagging operations under the early appropriations for snagging in western rivers. The appropriations for it and for Current River are:

Date of act.	Black River.	Current River.
June 2, 1872		$5,000.00
June 14, 1880	$15,000.00	
March 3, 1881	6,000.00	2,000.00
August 2, 1882	10,000.00	
July 5, 1884	20,000.00	
August 5, 1886	5,000.00	
August 11, 1888	12,000.00	
September 19, 1890	12,000.00	
July 13, 1892	5,000.00	
August 18, 1894	9,500.00	8,000.00
June 3, 1896	8,000.00	2,000.00
March 3, 1899	8,000.00	5,000.00
June 13, 1902	21,700.00	6,900.00
May 31, 1904, allotted from maintenance appropriation, act of June 13, 1902	[a] 8,580.50	2,935.00
March 3, 1905 (apportioned)	13,000.00	5,000.00
March 2, 1907 (apportioned)	13,000.00	5,000.00
Total appropriations	166,730.50	41,835.00
Receipts from sales fiscal year 1907	7.00	
Total receipts	166,737.50	41,835.00

[a] $8,500 less $319.50 not used and returned to the Treasury.

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COMMERCIAL STATISTICS.

Both rivers were at a fair boating stage all the year.

List of vessels that navigated Black River from May 31, 1907, to June 1, 1908.

Name.	Net tonnage.	Draft loaded. Steamer.	Draft loaded. Barges.	Between—	Round trips.	Passengers.
		Ft. in.	Ft. in.			
Miriam	65	3 6	.....	Mouth Strawbery and Newport	5	10
Choctaw	44	3 0	4 6	Poplar Bluff and Pocahontas	1	.....
				Newport and Black Rock	2	.....
				Newport and Jacksonport	1	.....
				Newport and Lockharts	5	.....
Roy	49	2 6	3 0	Poplar Bluff and head Big Island	59	.....
				Poplar Bluff and Old River Landing	10	.....
Minnehaha	46	3 0	5 0	Black Rock and Newport	40	.....
Geo. Pope	97	3 0	5 0	Black Rock and Newport		.....
Pocahontas	35	2 4	4 0	Pocahontas and Lockharts Ferry	19	.....
Starr	43	2 6	5 0	Jacksonport and mouth Strawberry	20	.....
Sunrise[a]	3½	2 5	3 6	Pocahontas and mouth Strawberry	20	.....
Leader[a]	6	1 4	3 0	Jacksonport and Strawberry	20	.....
Hickory[a]	5	2 0	3 0	Brookings and 40 miles above	200	.....
Henry F. Kath[a]	5	3 0	3 6	State line and Corning	102	.....

[a] Gasoline power boats; all others steamboats.

List of vessels that navigated Current River from May 31, 1907, to June 1, 1908.

Name.	Net tonnage.	Draft loaded. Steamer.	Draft loaded. Barge.	Between—	Round trips.	Passengers.
		Ft. in.	Ft. in.			
Pocahontas	35	2 4	4 0	Pocahontas and Johnsons Landing	15	.....
				Pocahontas and High Banks	10	.....

Classification of commerce reported, year ending May 31, 1908.

Articles.	Black River.	Current River.	Articles.	Black River.	Current River.
	Tons.	Tons.		Tons.	Tons.
Cotton	39	.....	Railway ties	2,575	14,214
Cotton seed	120	185	Miscellaneous	561	122
Lumber	5,540	420			
Stave bolts	77,679	1,050	Total reported	140,826	27,696
Provisions	211	65			
Saw logs	54,111	10,940	Estimated value	$517,905	$115,398

X 8.

IMPROVEMENT OF ST. FRANCIS AND L'ANGUILLE RIVERS, ARKANSAS.

OPERATIONS THIS FISCAL YEAR.

The snag boat *Johnson* (hand propelled) was prepared for work early in July, 1907, and snagging operations were commenced at Ruff Bend (73) on July 11, from which point the boat worked upstream to the mouth of Tyronza River (118), where it arrived August 9, 1907. From Tyronza the boat worked downstream, reaching the mouth October 9, 1907. From the mouth of the river the

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Johnson worked back up the stream to Madison (70), at which point work was suspended and the boat laid up for the winter on December 31, 1907, having removed during the fiscal year 776 snags, cut 4,103 trees, broken up 31 drifts, and traveled 237 miles.

The balance available July 1, 1908, will be applied to snagging operations and care of plant. The amount estimated as needed in the fiscal year ending June 30, 1910, is for maintenance of channel by snagging operations.

Money statement.

July 1, 1907, balance unexpended	$12,152.26
June 30, 1908, amount expended during fiscal year for maintenance of improvement	5,374.29
July 1, 1908, balance unexpended	6,777.97
July 1, 1908, outstanding liabilities	133.85
July 1, 1908, balance available	6,644.12
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	9,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

The earlier examinations and the earlier operations were made under appropriations for these in conjunction with other rivers. Of the expenditures under those appropriations this office has no record.

The separate appropriations are as follows:

March 3, 1871, St. Francis River, Arkansas	$10,000.00
June 14, 1880, St. Francis River, Arkansas	5,000.00
July 5, 1884, St. Francis River, Arkansas	12,000.00
August 5, 1886, St. Francis River, Arkansas	8,000.00
August 11, 1888, St. Francis River, Arkansas	4,000.00
September 19, 1890, St. Francis River, Arkansas	4,000.00
August 18, 1894, St. Francis River, Arkansas (part)	8,000.00
June 3, 1896, St. Francis River, Arkansas	8,000.00
March 3, 1899, St. Francis River, Arkansas	8,000.00
June 18, 1878, L'Anguille River, Arkansas	10,000.00
March 3, 1879, L'Anguille River, Arkansas	5,000.00
June 14, 1880, L'Anguille River, Arkansas	2,000.00
June 13, 1902, St. Francis and L'Anguille rivers, Arkansas	9,000.00
May 31, 1904, allotted from appropriation for maintenance of river and harbor improvement, act June 13, 1902 (less $62.81 returned)	4,237.19
March 3, 1905	6,000.00
March 2, 1907	12,000.00
Total appropriations for St. Francis and L'Anguille rivers	115,237.19

Expended to June 30, 1908:		
Old project	$84,000.00	
New project	24,459.22	
		$108,459.22
Unexpended July 1, 1908		6,777.97

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COMMERCIAL STATISTICS.

Between July 25 and December 1, 1907, the depths on several shoals above Parkin (116) were reported as being only 6 to 8 inches. Below that point the least depths reported between August 1 and November 1, 1907, were as follows: Wittsburg (98) 12 inches; Big Eddy shoal (82) 18 inches; Madison (70) 15 inches; Sand Slough (68) 18 inches, and Rock bar 20 inches. Full reports of commerce were not received, especially from the small boats operating in the sunk lands above Marked Tree.

List of vessels reporting having navigated St. Francis River, Arkansas, between May 31, 1907, and June 1, 1908.

Name.	Net tonnage.	Draft loaded. Steamers.	Draft loaded. Barges.	Between—	Round trips.	Passengers.
		Ft. in.	Ft. in.			
Watkins	46	2 0	.....	Head of Old River, Marianna and Helena.	64	.....
Kit Carson	96	3 0	6 0	Cut-off and mouth	2	.....
Dolphin, No. 3	355	4 0	6 0	.....do	45	.....
Dauntless	26	2 6	3 0	Marked Tree and Madison	50	300
Hazel Rice	101	3 0	5 0	Haleside and Helena	3	.....
Beaver	314	4 6	6 6	Madison to mouth	3	.....
C. M. Johnson	41	3 6	5 0	Raggio and mouth	6	.....
Zerah	71	4 6	.....	Helena and Marianna	5	.....
City of St. Joseph	182	4 6	.....	Cow Bayou and Memphis	8	121
Lake City	17	1 8	2 0	Parkin and Marked Tree	(?)	.....
Fred Hartweg	246	5 6	7 0	Mouth and Madison	.....	.....
Pacific, No. 2	416	5 6	7 0	.....do	.....	.....
Mariner	371	6 0	.....	.....do	(?)	.....
Wash Honshall	134	4 6	.....	.....do	.....	.....
Eva[a]	4	2 2	3 6	Wittsburg and Madison	8	8
Josie[a]	2	.....	.....	St. Francis Bay and Madison	100	.....
Myrtle[a]	1.5	1 6	0 8	Wittsburg and Madison	50	.....
Dora Clarke[a]	14	2 0	3 0	Ashworth and Helena	75	250
Chickasaw[a]	13	2 8	2 0	Marked Tree and Parkin	35	.....
				Nealey Ferry and Helena	3	168
Billy Mack[a]	2	2 6	2 0	Wittsburg and cut-off	25	.....
Emma[a]	2.61	2 0	1 4	Madison to Blackfish Bayou	10	.....
Rambler[a]	5	1 10	2 6	Parkin and Madison	42	.....
Lone Dave[a]	2	2 0	1 6	Parkin and Raggio	50	.....
Delphos[a]	(?)	1 4	3 0	Madison and mouth	90	.....
Edith King[a]	2	0 8	1 6	Madison and cut-off	10	.....
Birmingham	187	5 0	6 0	Madison and mouth	19	.....

[a] Gasoline power boats, all others steamboats.

Classification of commerce reported year ending May 31, 1908.

Articles.	Tons.	Articles.	Tons.
Cotton	1,019	Railway ties	1,000
Cotton seed	1,412	Mussel shells	567
Live stock	239	Miscellaneous	1,352
Lumber	2,773		
Provisions	1,729	Total tonnage reported	286,330
Grain	1,679		
Saw logs	275,050	Estimated value	$1,376,757

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APPENDIX Y.

IMPROVEMENT OF RIVERS AND HARBORS IN THE ST. LOUIS, MISSOURI, DISTRICT.

REPORT OF CAPT. G. R. LUKESH, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Removing snags and wrecks from the Mississippi River below the mouth of the Missouri River.
2. Mississippi River between the Ohio and Missouri rivers.

ENGINEER OFFICE, UNITED STATES ARMY,
St. Louis, Mo., July 18, 1908.

SIR: I have the honor to transmit herewith the annual report for the works under the charge of this office for the fiscal year ending June 30, 1908.

Very respectfully,

G. R. LUKESH,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

Y 1.

REMOVING SNAGS AND WRECKS FROM THE MISSISSIPPI RIVER BELOW THE MOUTH OF THE MISSOURI RIVER.

A concise statement of the project for and history of this work will be found in the present Annual Report of the Chief of Engineers, United States Army, to which this is appended, as well as on page 2621 of the Annual Report of the Chief of Engineers for 1900.

This work is now being done by two large steel-hull snag boats—*H. G. Wright* and *J. N. Macomb*—fitted with all necessary tools and appliances and operated by hired men. They patrol the river between the mouth of the Missouri River and Natchez, Miss., occasionally going as far down as New Orleans, La.

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Descriptions of these boats will be found in the Annual Report of the Chief of Engineers, 1895, page 2054 et seq.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

At the beginning of the fiscal year the *Wright* began its patrol of the river, continuing until the end of May, 1908, and making six round trips over the district between the mouth of the Missouri River and Natchez, Miss. (about 950 miles), two between Natchez and the mouth of Red River (75 miles), and one between Red River and New Orleans, La. (225 miles). In addition this boat was engaged for a week in February in the recovery of sunken machinery at Beaver Dam rock.

The *Macomb*, which was laid up in ordinary, engaged in annual repairs from the beginning of the year until August 1, thereafter patrolled the river in four round trips to Natchez and one to Red River, and, to take advantage of the high water, was laid up for repairs at the end of March. The repairs were completed and the boat was ready for service June 1, when the *Wright* was put out of commission, but as the river was then at flood stage and remained so during the entire month of June, the *Macomb* was also held out of commission during the remainder of the year.

A summary of the work accomplished during the fiscal year is given in the following table:

Name.	Snags pulled.	Trees cut.	Drift piles removed.	Wrecks removed.	Miles traversed.
H. G. Wright	1,589	3,374	2	4	12,625
J. N. Macomb	2,155	1,801	17	2	8,186
Total	3,744	5,175	19	6	20,811

The work upon wrecks and sunken vessels during the year was as follows:

Snag boat *Wright*, October 28–29, 1907, removed the boilers and machinery of the steamer *Moran*, at Cairo, Ill.; December 2–3, 1907, broke up barge at West Memphis, Ark.; December 6, 1907, raised steamer *Iona*, at Cottonwood Point, Mo.; December 23, 1907, removed machinery from steamer *Frank*, at O'Briens Landing, Mo.; January 17, 1908, broke up barge at Island No. 76; February 17, 1908, removed machinery from U. S. pile driver *No. 2*, at Beaver Dam rock; April 17, 1908, broke up barge at Island No. 10.

Snag boat *Macomb*, September 18, 1907, raised barge at O'Donnells, Ark.; September 19, 1907, raised barge at Cottonwood Landing, Mo.; November 5, 1907, raised barge at Helena, Ark.; November 8, 1907, removed machinery of steamer *Currin*, at Caruthersville, Mo.; December 13, 1907, raised barge at Bellevue Landing, Miss.; January 13 and March 19, 1908, worked upon wreck of steamer *City of St. Louis*, at St. Louis, Mo.

The trees referred to are generally leaning trees in bends of the river, that are liable to fall into the water and become obstructions to navigation.

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APPROPRIATIONS.

The appropriations from the beginning of the work to the year 1878 were made in lump sums, principally under the titles of "Improvement of the Mississippi, Missouri, and Arkansas rivers," and were applied to the several streams as their needs or the terms of the laws required. Appropriations from 1879 to 1888 were specifically made or allotted for this work. In the latter year, August 11, an annual appropriation of an amount not to exceed $100,000 was made for this work, since which time the snag boats have patrolled the river whenever necessary, in order to keep the channel free from obstructions, such as logs, drift jams, leaning trees, and such wrecks as, with their appliances, they were able to remove or to break up with explosives.

The details of the expenditures and the work done are shown in the following table:

Table of amount expended and work done in removing obstructions in Mississippi River between mouth of Missouri River and New Orleans, La., from March 28, 1868, to June 30, 1908.

Year.	Amount expended.	Work done.			
		Snags pulled.	Trees cut.	Drift piles removed.	Wrecks removed.
March 28, 1868, to June 30, 1871	.....	3,271	37,428	30	.....
Fiscal year ending June 30—					
1872	.....	1,365	2,621	12	.....
1873	$46,901.40	1,365	1,718	5	.....
1874	72,802.80	630	515	6	.....
1875	70,727.01	1,461	2,984	14	.....
1876	49,854.80	1,218	1,589	5	1
1877	36,220.08	676	408	4	.....
1878	20,122.54	889	3,346	1	.....
1879	121,820.16	1,133	2,690	5	.....
1880	74,988.94	1,522	60	19	.....
1881	102,308.43	1,057	647	6	.....
1882	75,311.29	1,909	4,983	32	.....
1883	69,540.59	2,775	26,297	34	.....
1884	18,390.48	958	4	3	.....
1885	45,395.47	1,692	16,990	.....	.....
1886	20,047.71	693	567	.....	.....
1887	43,583.12	2,030	5,269	10	.....
1888	17,302.29	798	348	.....	.....
1889	67,511.37	1,864	9,172	34	8
1890	49,089.17	2,861	12,112	23	1
1891	92,720.97	3,459	21,316	37	.....
1892	98,250.00	3,389	20,571	.....	.....
1893	96,497.23	2,916	8,214	16	.....
1894	88,252.46	3,057	22,861	19	5
1895	100,000.00	3,397	17,529	22	3
1896	80,496.26	2,979	19,648	11	1
1897	86,421.64	3,072	31,014	24	2
1898	88,917.74	4,253	14,856	32	3
1899	88,928.15	3,300	30,695	34	.....
1900	86,355.29	4,479	15,170	19	.....
1901	86,710.05	3,566	19,746	28	.....
1902	93,055.27	3,907	28,870	27	7
1903	72,587.48	1,552	6,895	2	.....
1904	88,245.25	4,654	17,034	18	2
1905	81,822.81	4,118	15,241	19	12
1906	85,662.36	2,564	14,478	16	.....
1907	85,669.59	3,339	2,772	23	7
1908	97,889.35	3,744	5,175	19	6
Total	2,597,394.95	91,838	441,664	609	58

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Amount expended during the fiscal year was $97,889.35. A statement of this expenditure, as required by law, is given in the accompanying table showing the summary of expenses of operating the snag boats.

Authority was obtained, December 15, 1906, to use that part of the fund unexpended in the operations of the snag boats for the removal of Beaver Dam rock (and other rocks), considered obstructive and dangerous in the channel, but, owing to the high stage of water had continuously since that date, work upon the rock was not begun until the low water of the fall season (November, 1907), when an accurate survey and exploration of the entire rock was made to a depth of 12 feet below the zero of the gauge at Commerce, Mo., about 1 mile distant. At this depth the rock covers about 1⅝ acres, rising in numerous peaks, the highest reaching the elevation of the 8.5-foot stage on the gauge, and the whole containing about 12,000 cubic yards of soft sandstone. Of this quantity, about one-third, covering an acre of the rock, must be removed by blasting to secure 8 feet clear depth over the ledge at a zero stage.

Drilling for blasting was begun December 18, and continued, with many interruptions and much loss of time because of interference by running ice and the winter storms, until February 10, when by premature blast two old pile-driver hulls used as drill platforms were sunk and five persons, including Mr. E. C. Constance, junior engineer in local charge, were seriously injured, although none fatally. Shortly after this accident and before the work could be resumed the river rose to such height and continued throughout the remainder of the year at such stage as to render further work inexpedient because of the increased difficulty and expense.

During the time of operations about 15 per cent of the area and contents of the rock to be removed were drilled and blasted.

The work will be resumed during the coming low-water season.

The work done by the snag boats is of great benefit to the commerce and navigation on the river. Before the river was so completely patrolled as it now is, the sinking of steamboats and other river craft by running on snags was a common occurrence. During recent years such disasters seldom occur. Although life and property would seem to be much safer than formerly, the rate of insurance has not materially decreased.

It is proposed during the coming year to continue operating these snag boats, as provided in the river and harbor act of August 11, 1888.

The statistics relating to the commerce benefited by their operation will be found in the report of operations for this year for the improvement of the Mississippi River from the mouth of the Missouri to the mouth of the Ohio River, and in the reports of the Mississippi River Commission and the district officers thereunder.

The headquarters of the snag boats is in St. Louis.

The amount of customs collected at St. Louis during the fiscal year was $2,661,781.70.

The amount of internal revenue collected was $7,897,604.58.

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ALLOTMENTS.

Previous to March 3, 1879 (approximated)	$358,627.85
By act of—	
March 3, 1879	100,000.00
June 14, 1880	100,000.00
March 3, 1881	80,000.00
March 2, 1882	85,000.00
July 5, 1884	72,950.63
August 5, 1886	56,250.00
August 11, 1888	100,000.00
Fiscal year ending June 30—	
1890	49,089.17
1891	92,720.97
1892	98,250.00
1893	96,497.23
1894	88,252.46
1895	100,000.00
Fiscal year ending June 30—	
1896	$80,496.26
1897	83,421.64
1898	88,917.74
1899	88,923.15
1900	86,355.29
1901	86,710.05
1902	93,055.27
1903	72,587.48
1904	88,245.25
1905	81,822.81
1906	85,662.36
1907	85,669.59
1908	97,889.35
Total	2,597,394.05

Money statement.

July 1, 1907, balance unexpended	$5,648.77
June 30, 1908, amount drawn under section 7, act of August 11 1888	100,000.00
	105,648.77
June 30, 1908, amount expended during fiscal year 1908	97,889.35
July 1, 1908, balance unexpended	7,759.42
July 1, 1908, outstanding liabilities	7,678.22
July 1, 1908, amount available for fiscal year 1909	100,000.00

Summary of cash expenditures for operating U. S. snag boats H. G. Wright and J. N. Macomb in connection with the work of removing obstructions in Mississippi River, and in the removal of Beaver Dam rock, during the fiscal year ending June 30, 1908.

Application.	For fiscal year 1907.	For fiscal year 1908.					
		July.	Aug.	Sept.	Oct.	Nov.	Dec.
Office expenses	$13.42	$4.74	$3.08	$724.50	$25.34	$723.80	$69.60
Expenses of snag boat H. G. Wright:							
Crew	2,050.84	2,158.83	2,152.33	2,174.00	2,189.32	2,210.33	2,240.00
Outfit	.....	.....	.....	.....	33.68	.....	.....
Fuel	266.60	854.00	320.12	1,211.15	590.89	1,316.22	589.55
Subsistence	.....	604.46	547.71	303.48	613.20	296.55	428.77
Supplies	.....	.....	.....	.....	8.00	.....	.....
Repairs	128.84	393.26	111.92	97.03	83.43	42.45	.....
Miscellaneous	11.25	.....	.....	.....	.....	.....	.....
Expenses of snag boat J. N. Macomb:							
Crew	2,290.61	2,113.18	2,207.00	2,187.83	2,141.66	2,165.67	2,203.66
Outfit	432.54	.....	.....	135.85	6.38	.....	.....
Fuel	365.95	315.90	754.81	782.67	1,077.90	624.15	1,021.17
Subsistence	.....	684.31	269.07	868.51	335.22	363.67	538.31
Supplies	11.22	25.00	.....	.....	.....	2.00	.....
Repairs	77.50	553.63	.....	8.63	133.80	.....	49.92
Miscellaneous	.....	.....	.....	.....	.....	.....	.....
Total	5,648.77	7,707.31	6,366.04	8,493.65	7,173.82	7,744.84	7,140.98

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Summary of cash expenditures for operating U. S. snag boats H. G. Wright and J. N. Macomb in connection with the work of removing obstructions in Mississippi River, and in the removal of Beaver Dam rock, during the fiscal year ending June 30, 1908.—Continued.

Application.	For fiscal year 1908.						
	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.
Office expenses	$762.23	$8.17	$1,025.48	$15.75	.....	$82.60	$2,398.71
Expenses of snag boat H. G. Wright:							
Crew	2,239.60	2,240.00	2,227.50	2,269.66	$2,347.67	67.67	26,567.15
Outfit	.....	.....	.....	.....	.....	76.52	110.20
Fuel	1,112.70	375.97	1,403.99	647.35	855.54	110.15	9,504.23
Subsistence	354.94	437.95	315.02	690.83	157.02	101.49	4,382.42
Supplies	.....	.....	.....	24.75	.....	434.95	462.70
Repairs	252.36	.....	.....	42.00	.....	537.42	1,698.71
Miscellaneous	.....	.....	.....	3.39	.....	.....	14.64
Expenses of snag boat J. N. Macomb:							
Crew	2,216.00	2,225.00	2,257.25	2,001.92	1,767.43	88.68	25,365.89
Outfit	16.50	.....	.....	385.09	37.50	67.42	1,061.28
Fuel	617.06	1,219.58	489.65	173.47	182.52	.....	7,624.33
Subsistence	748.52	299.78	303.28	392.56	822.67	352.84	5,478.74
Supplies	.....	.....	.....	513.41	.....	17.75	569.38
Repairs	262.36	.....	17.53	1,724.75	724.78	80.60	3,633.45
Miscellaneous	.....	.....	.....	3.35	.....	.....	3.35
Total	8,791.67	6,806.45	8,089.70	8,888.28	6,395.02	1,958.09	90,954.63
Removal of Beaver Dam rock:							
Labor	.....	.....	.....	.....	.....	.....	4,289.38
Material, etc	.....	.....	.....	.....	.....	.....	527.82
Lost property	.....	.....	.....	.....	.....	.....	875.81
Use of plant, subsistence, etc	.....	.....	.....	.....	.....	.....	1,271.96
Total	.....	.....	.....	.....	.....	.....	97,889.35

Recapitulation.

Expenses of office and snag boats:	
Fiscal year 1907 (paid in 1908)	$5,648.77
Fiscal year 1908	85,306.91
Removal of Beaver Dam rock	6,934.67
Total	97,889.35

Y 2.

IMPROVEMENT OF MISSISSIPPI RIVER BETWEEN OHIO AND MISSOURI RIVERS.

PROJECT OF 1881, REVISED IN 1883, 1903, AND 1905.

A concise statement of the project for and history of this work will be found in the Annual Report of the Chief of Engineers for 1906, page 462, as well as on page 2631 of the Report of the Chief of Engineers for 1900.

Reference should be made to the Report of the Chief of Engineers, United States Army, for 1894, pages 1577 et seq., for information relating to the development of the various forms of construction and for a résumé of the various types employed between 1872 and 1894, and to the Reports of the Chief of Engineers, United States Army, for 1895, page 2059; 1896, page 1717; 1897, page 2012; 1898, page 1698; 1900, page 2632, and 1901, page 2169, for minor details as to forms of construction.

Since the adoption of this project work has been done substantially according to the methods referred to above at the following locali-

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ties: Mouth Missouri River, Sawyer Bend, St. Louis Harbor, Cahokia Chute, Arsenal Island, Horsetail bar, Carroll Island, Twin Hollows, Pulltight, Beards Island, Chesley Island, Jim Smiths, Sulphur Springs, Foster Island, Lucas, Herculaneum, Calico Island, Cornice Island, Forest Home, Osborne Field, Michaels Landing, Rush Tower, Fish Bend, Danby Landing, Ames Island, Rush Towhead, Penitentiary Point, Sycamore Landing, Fort Chartres, Crooks, Turkey Island, Mudd Landing, Moro Island, Ste. Genevieve, Fairy Island, Kaskaskia Island, Horse Island, Chester, Crain Island, Liberty Island, Liberty Bend, Lacours Island, Willard, Hamburg, Devil Island, Minton Point, Cape Girardeau, Commerce Island, Burnham Island, Powers Island, Goose Island, Philadelphia Point, Commercial Point, Prices Landing, Buffalo Island, Dogtooth Bend, Greenleaf Bend, Beechridge, Hurricane Field, Eliza Towhead, Eliza Point, Greenfield Bend, and vicinity of Cairo.

During the fiscal year ending June 30, 1908, work for the permanent improvement of the river has been carried on, as hereinafter described, at James Landing, Crain Island, Willard Landing, Devil Island, and Eliza Towhead. (See Pls. I and II.)

The project adopted for the permanent improvement of the Mississippi River between the mouths of the Ohio and Missouri rivers was approved by the Chief of Engineers, United States Army, March 31, 1881. The estimate of the cost, as revised in 1883, was $16,397,500. The project was modified by the river and harbor act of June 3, 1896, to permit the construction and operation of dredges. It was again modified to some extent in 1903 by the Board of Engineers for Rivers and Harbors in report dated November 12, 1903, the dredging authorization of which was adopted by Congress in the river and harbor act of March 3, 1905.

The interpretation of this act virtually stopped all construction work for the permanent improvement of the river within the district, except for the small unexpended balances from previous appropriations. Attention being called thereto, an unallotted portion of the appropriation was made available by an act approved June 29, 1906, for the construction of works urgently needed.

By the report of 1903 the cost is increased $20,000,000 in addition to expenditures already made, provided the projects in force be adhered to throughout. The cash expenditures to December 31, 1903, are considered as approximately the cost of the work up to the date of the report of the Board. They were $10,476,654.53. The total estimated cost as last revised is therefore $30,476,654.53.

The total amount appropriated to June 30, 1908, was $12,904,999.98. Of this amount $180,000 was allotted by acts and projects for improvement between the Illinois and Missouri rivers, including Alton Harbor, leaving a balance of $12,724,999.98 to be applied to the project for the general improvement between the mouths of the Ohio and Missouri rivers. The balance of the last revised estimate not appropriated June 30, 1908, is therefore $17,751,654.55.

WORKS OF IMPROVEMENT.

Because of the small balance of funds available, for the reasons stated, operations for the construction of works of permanent improvement were confined to the repair, maintenance, and completion

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of hurdles and revetments already placed under the original project. Three dredges were in commission throughout the fall, operating upon 12 obstructing bars which developed during the low-water season of navigation. The construction of the various parts of the two suction dredges, required by act of Congress approved March 3, 1905, and under contract, was continued, and at the close of the year one dredge had been completed and delivered and fair progress had been made upon the other, so that its delivery, together with that of the ponton and pipe lines for both, is assured not later than August, 1908. The alterations to two older dredges were completed. Such local surveys and examinations were made as were needed. Gauges were maintained and read throughout the year.

The plant was repaired and cared for at the engineer depot, St. Louis, and in the fleets at Claryville, Mo., and Santa Fe, Ill. In the spring the Claryville fleet was abandoned and the vessels there were moved to Santa Fe for economy in their care.

Materials were procured by contract, and by hired labor, as was deemed most economical and advantageous to the United States.

Reports from assistants, giving details and accompanied by charts showing the locations of the various works, are on file.

CONSTRUCTION WORKS.

In the repair, completion, and extension of permanent works for channel regulation and improvement the standard forms of hurdles and revetments were used, consisting, for the former, of permeable dikes of piling driven in one to three rows of 3-pile clumps through wide foundation mattresses woven of willow and cottonwood brush, and for the latter, of similar mattresses placed along caving banks between the low-water contour and the underwater foot of the bank slope, and stone riprap placed above the low-water contour to the bank top, or as high as the proper natural slope (1:2) might have extended.

JAMES LANDING, ILL. (34 MILES BELOW ST. LOUIS).

[Sept. 3–Oct. 18.]

New bank protection.—During the spring and summer of 1907 continuous caving, with a rapid recession of the bank line, occurred between the end of the work of 1906 (James Landing) and the head of the work of 1904 (Osborne Field). In order to check this recession, primarily to protect the work at Osborne Field, Ill., from being outflanked by the river, the work of 1906 was extended downstream to a junction with the work of 1904. Incidentally protection was also given to the Monroe County levee which, at this locality, is in dangerous proximity to the river bank. The work was done during September, October, and November; 3,265 linear feet of brush mattress—100 feet wide—were placed, connecting with the upper end of the mattress at Osborne Field, Ill., and above this mattress the bank was graded and the stonework placed to the 18-foot stage. The bank above the revetment of 1906 having been graded by the river to a slope favorable for the reception of stone, the stonework was raised from the 14-foot contour to the 19-foot throughout, except for 465 linear feet covered with silt.

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The extent of the protection now in place at this locality is as follows: 11,200 linear feet of mattress; 500 linear feet of stonework raised to the 16-foot stage; 5,265 feet to the 19-foot stage; 3,335 feet to the 18-foot stage, and at Osborne Field, 1,850 feet to the 11-foot stage, leaving 250 feet still unrevetted with stone. Revetting this small portion of the bank and making the contour of the stonework at Osborne Field uniform throughout has been prevented since the spring of 1905 by a bar along the river front denying approach with materials.

CRAIN ISLAND, MISSOURI (72 MILES BELOW ST. LOUIS).

[July 1–16.]

Repair of hurdle.—A body of drift having collected above hurdle dam No. 1, a mattress 375 feet in length and 33 feet in width was built on top of the drift and the mass was sunk against the dam, adding greatly to the strength of the section repaired during the latter part of the preceding fiscal year.

Bank protection—Repair of revetment.—The sloping spur hurdle, in process of construction at the close of the last fiscal year, was completed, and two others, each 50 feet in length, were built.

The stone revetment, for 900 linear feet (18,780 square feet), was repaired. As the greater part of the repaired work is in the vicinity of the three-spur hurdles, additional security was thus given to their shore ends.

WILLARD LANDING, ILLINOIS (111 MILES BELOW ST. LOUIS).

[July 17–31.]

Repair of hurdle dam.—A large amount of drift having collected above that portion of the hurdle dam repaired during the latter part of the spring season (1907), a mattress, 610 feet long and 35 feet wide, was constructed on the drift and weighted with stone until the accumulation rested on the river bottom.

DEVIL ISLAND, ILLINOIS (120 MILES BELOW ST. LOUIS).

[July 1–31.]

Repair of hurdle dam.—The work of repairing the hurdle dam at the head of the island was in progress at the beginning of the fiscal year, the foundation mattress having been completed across the main break at that time. An apron mattress, 130 feet in length, was constructed and sunk across another much smaller break. The shore end of the hurdle was protected by a mattress 264 feet in length (25,822 square feet), and 5,386 square feet of stonework was placed on the bank above it. Pile driving was begun near the middle of July, and was completed at the end of the month. The reconstructed section of hurdle makes an obtuse angle, upstream, with the old hurdle line. Its length from the nearest point of the Illinois shore is 270 feet.

A section of old piling, 300 feet long, in the body of the hurdle, was strengthened by driving a single row of clumps below it. Another

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section, 400 feet long, was reenforced by a row of clumps and single piles driven above it. The original length of hurdle, 1,200 feet, has been increased by reconstruction to 2,000 feet; of this increase, 270 linear feet were built during the fiscal year.

Bank protection—Repair of revetment.—Active caving of the bank of this island at two places near the lower end of the bank protection was causing a recession of the bank and destroying the revetment. In one cave two sloping spur hurdles, 60 and 100 feet in length, respectively, were constructed and 350 linear feet of foundation mattress were placed along the bank; in the other a foundation mattress extending from the present shore line to the old foundation (165 linear feet) was placed, and a sloping spur hurdle 100 feet in length was driven through it.

ELIZA TOWHEAD, ILL. (168 MILES BELOW ST. LOUIS).

[Oct. 19–Dec. 6.]

New bank protection.—For a brief but comprehensive history of this locality and of the previous work done reference is made to the Report of the Chief of Engineers for 1907, page 1545.

Continued and rapid caving caused a further recession of the bank at this locality, with great damage to the work placed in the fall of 1906. Mattresses 100 to 130 feet in width, and in three sections, were constructed, connecting the sections placed in 1906, thus making the mattress work continuous throughout the bank reach protected. The stonework was carried up to the average height of the 13-foot stage (St. Louis gauge) throughout; to attempt a higher contour was not considered advisable at this time on account of the lateness of the season (November) and the excessive amount of earth to be moved before the stone could be placed. It is expected that the next high water will grade the top zone of this bank, at least partially, so that the stonework can be raised to a higher contour with a minimum of effort.

The total linear feet of protected bank is now 3,535 feet. In accomplishing this result 370,925 square feet of mattress and 123,340 square feet of stonework were placed.

DREDGING.

Dredges *Nos. 2*, *3*, and *4* were in commission as follows: *No. 2*, September 11 to November 30; *No. 3*, September 3 to December 17, and *No. 4*, August 14 to December 24, 1907. Throughout this low-water season they were operated where necessary and were withdrawn from service and sent to winter quarters as soon as running ice threatened.

Before placing dredge *No. 4* at work in the channel, it was taken to Horsetail bar and its pumps and reconstructed suction heads were given a thorough test in materials ranging from silt to coarse gravel. The results were most satisfactory; during fifty working hours 1,250 cubic yards were moved per dredging hour.

Threatened shoaling on bars to 8-feet depths was anticipated as far as possible by placing dredges at the critical points as soon as

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soundings showed that shoaling liable to become obstructive was in progress.

Work was done upon the following bars with most beneficial results: Ames Towhead, Dickey Field, Little Rock incline, Baumstark, Phillips Landing, Mansker, Anchor Landing, Seventy-Six, Grand Tower Island and Bend, Bainbridge, and Beechridge.

The total number of channels dredged at the 12 localities named was 19, with a combined length of 20,500 feet and an average dredged width of 150 feet.

The dredged channels were in constant use by the river craft after their completion and maintained the 8-foot depth of channel required throughout the district, except for short intervals at several localities, where the depth decreased to 7 feet until a dredge was available for work at each, when the obstructing bar was quickly cut away.

The total amount of material excavated was about 989,000 cubic yards in 1,568 dredging hours, or at the rate of 630 cubic yards per hour.

Fluctuations in the stage of the river caused the shifting of the shoals at Baumstark, Mansker, Bainbridge, and Grand Tower Island Bend, necessitating repetition of dredging at all of them.

Great relief was given at the railway incline at Little Rock, Mo., by dredging the shoal obstructing approach and widening the channel leading thereto.

The dredges were in operation only about one-fourth of their time in commission; but their efficiency per dredging hour as compared with that of the preceding fiscal year has been increased about 25 per cent. This result is due to the installation of the new pumps on Nos. 3 and 4 in conjunction with their reconstructed suction heads and pipe lines. The percentage of increased efficiency would have been higher if the low-pressure engines on dredge No. 4 had not broken down, necessitating their removal and the operation of the dredge for the remainder of the season by its high-pressure cylinders alone.

. The final cost of the dredging was about 10⅜ cents per cubic yard of sand moved, which includes the cost of all idle time of the dredges and their crews and the upkeep and repairs to the former during the entire year.

If the dredges had been run for the entire time in commission, the expense would have been augmented only by the increased amount of fuel, oil, etc., consumed, and the cost for such continuous operation with the same average output would have been reduced to about 4¼ cents per cubic yard. As dredges must be held in readiness for work as it offers, and which depends upon the fluctuation in river conditions, such variations in the cost of the work can not be avoided.

PLANT.

The efficiency of the plant was maintained by ordinary or extensive repairs, as were required. No addition was made to the number of vessels in any class of the floating plant. A number of barges are unserviceable without extensive repairs; five are in such poor condition that they have been condemned as unfit for further service or

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repair and are advertised to be sold. One dredge has been dismantled on account of the unserviceable condition of its old wooden hull and its small capacity, but its place is taken by a new steel hull dredge of much greater capacity. Six barges were loaned to the Memphis office in September and were retained there during the remainder of the year. Two old pile drivers were sunk and lost at Beaver Dam rock, and two were transferred permanently, together with the steamer *Gen. T. L. Casey*, to the Mississippi River Commission.

Alterations of dredges Nos. 3 and 4.—The alterations on these dredges, begun in the fiscal year 1906–7, were completed in August.

New dredges Nos. 5 and 6.—The contractors for the hulls, boilers, cabins, and propelling machinery of these dredges have made good progress. Dredge No. 5 was delivered at the engineer depot on the 1st of May and the machinery has been since installed, so that this dredge will be available for service on delivery by the contractors of its pontons and pipe line which are expected in August, when No. 6 will also be delivered and then immediately made ready for service.

Engineer depot, etc.—The shops, buildings, machinery, tools and appliances at the engineer depot and at Little Rock quarry, together with all vessels, other floating plant and their equipment have been kept in order and all ordinary repairs absolutely necessary to maintain their efficiency have been made.

Much plant, tools and appliances, etc., was loaned during the year to the various survey parties operating under the Board on Examination and Survey of the Mississippi River, and under the Mississippi River Commission, and repairs for both of them were made as needed at the shops and yard of the engineer depot.

MATERIALS.

Of the materials required for construction works, 5,122 cubic yards of stone were procured by contract, and 18,787 cubic yards by hired labor at the quarry at Little Rock, Mo., which was in operation from September 5 to December 3, 1907. The brush, 4,010 cords, was procured by hired labor.

PHYSICAL DATA.

The gauges were maintained and read daily throughout the year and their records have been plotted on the hydrograph. During the year the river oscillated between stages 2.3 feet below and 30.9 feet above standard low water (4.0 feet St. Louis gauge).

Surveys were made between Herculaneum and Fort Chartres Landing, Little Rock and Head of Moro Island, Kirk Landing and Head of Liberty Island, Bishop Landing and Red Rock, Bainbridge and Eliza Point.

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Money statement.

July 1, 1907, balance unexpended		$577,581.60
Amount appropriated by sundry civil act approved May 27, 1908		250,000.00
June 30, 1908, miscellaneous receipts		13,593.04
		841,174.64
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$68,061.21	
For maintenance of improvement	396,409.57	
		[a] 464,470.78
July 1, 1908, balance unexpended		376,703.86
July 1, 1908, outstanding liabilities		21,709.98
July 1, 1908, balance available		354,993.88
July 1, 1908, amount covered by uncompleted contracts		68,738.17
Amount (estimated) required for completion of existing project		17,751,654.55
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement in addition to the balance unexpended July 1, 1908		250,000.00
Submitted in compliance with requirements of sundry civil act of July 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

June 10, 1872	$100,000.00	June 3, 1896	$275,000.00
March 3, 1873	200,000.00	June 4, 1897	673,333.33
June 23, 1874	200,000.00	July 19, 1897	325,000.00
March 3, 1875	200,000.00	July 1, 1898	673,333.33
August 14, 1876	200,000.00	March 3, 1899	673,333.33
June 18, 1878	240,000.00	June 6, 1900	100,000.00
March 3, 1879	200,000.00	June 13, 1902	650,000.00
June 14, 1880	250,000.00	March 3, 1903	650,000.00
March 3, 1881	600,000.00	April 28, 1904	650,000.00
August 2, 1882	600,000.00	March 3, 1905	650,000.00
July 5, 1884	520,000.00	March 2, 1907	250,000.00
August 5, 1886	375,000.00	May 27, 1908	250,000.00
August 11, 1888	300,000.00		
September 19, 1890	400,000.00	Total	12,904,999.98
July 13, 1892	525,000.00	Other receipts	28,005.47
March 3, 1893	658,333.33		
August 18, 1894	758,333.33		12,933,005.45
March 2, 1895	758,333.33		

CONTRACTS IN FORCE.

Name: Dubuque Boat and Boiler Works.
Work: Parts of two hydraulic dredges.
Cost: $238,000.
Date: December 26, 1906.
Date of commencement: Ten days after notice of approval.
Date of completion: April 30, 1908.
Date of delivery of first dredge extended for a reasonable time after September 30, 1907, by the Chief of Engineers, U. S. Army.
Date of delivery of second dredge extended for a reasonable time after April 30, 1908, by the Chief of Engineers, U. S. Army.

Name: Western Electric Company.
Work: Engines, dynamos, searchlights, and arc lights for two dredges.
Cost: $3,205.
Date: April 15, 1908.
Date of commencement: Upon notification that the dredges are ready.
Date of completion: Within thirty days after notification that the dredges are ready.

[a] Deduct $13.25 expended during the year on account of inspections for the Isthmian Canal Commission, leaving net amount of $464,457.53 expended upon the improvement.

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Name: C. J. and F. E. Briner.
Work: Wiring, lamps, etc., for two dredges.
Cost: $1,440.
Date: April 29, 1908.
Date of commencement: Upon notification that the dredges are ready.
Date of completion: Within thirty days after notification that the dredges are ready.

COMMERCIAL STATISTICS.

Receipts and shipments at St. Louis, Mo., during the year 1907.

	Tons.
Receipts:	
Coal and coke	155,470
Cotton and cotton products	3,199
Groceries and dairy products	1,068
Hay, seed, grain, flour, meal, etc	22,455
Live stock and products	23,171
Lumber	5,471
Merchandise and sundries	74,216
Vegetables and fruits	4,517
Wines and liquors	8
Total	289,575
Shipments:	
Barbed wire, ores, and metals (pig and manufactured)	1,202
Cotton and cotton products	1,354
Groceries and dairy products	4,890
Hay, seed, grain, flour, meal, etc	5,049
Live stock and products	3,620
Lumber	4,051
Merchandise and sundries	49,369
Vegetables and fruits	2,344
White lead, oils, etc	650
Wines and liquors	5,968
Wool	3
Total	78,500

Transferred by ferries across the river at St. Louis.

	Tons.		Tons.
1904	6,080,109	1906	7,374,978
1905	6,684,949	1907	8,905,542

Shipments of grain, including flour, meal, etc., and coal down the river from landings between St. Louis and Cairo during the year 1907 amounted to 65,467 tons.

Navigation between St. Louis, Mo., and points on the Missouri River as far as Kansas City, Mo., was established during the year by the Kansas City Transportation and Steamship Company with 2 steamboats and by 3 independent boats.

List of steam-power boats that arrived at St. Louis during the year 1907.

[Exclusive of Government vessels.]

Size of boats.	Draft.	Number.	Times arrived.
	Feet.		
Under 500 gross tons	2.5–6.0	57	503
Between 500 and 1,000 gross tons	4.0–7.6	12	799
Total		69	1,302

List of barges and scows that arrived at St. Louis during the year 1907.

[Exclusive of Government vessels.]

Size of boats.	Draft.	Number.	Times arrived.
	Feet.		
Under 500 gross tons	2.5–7.5	26	365
Between 500 and 1,000 gross tons	5.2–8.0	6	10
Total		32	375

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Number of vessels and their tonnage permanently and temporarily enrolled and licensed at the port of St. Louis, Mo., December 31, 1907.

	Number of vessels.	Gross tonnage.	Net tonnage.
Permanent enrolled steamers:			
Wood	61	17,333	16,373
Iron and steel	9	2,940	2,257
Permanent enrolled barges:			
Wood	5	431	431
Steel	1	1,162	1,162
Permanent enrolled steam yachts:			
Wood	5	360	240
Iron and steel	3	274	220
Licensed steamers:			
Wood	20	225	198
Iron and steel	2	56	29
Licensed barges, wood	2	25	25
Licensed steam yachts, wood	3	62	50
Total	111	22,868	20,980

Total cost and work done to June 30, 1908.

	New.			Completion or restoration.		
	Linear feet.	Square feet.	Cost.	Linear feet.	Square feet.	Cost.
Hurdles:						
Prior to July 1, 1907	415,083			9,615		
During fiscal year ending June 30, 1908—						
Crain Island						
Willard						
Devil Island						
Total	415,083			9,615		
Bank protection—mattress:						
Prior to July 1, 1907	300,895	35,050,596				
During fiscal year ending June 30, 1908—						
James Landing	8,265	842,200	$15,885.99			
Devil Island						
Eliza Towhead	2,990	370,925	17,700.41			
Total	307,150	35,763,721	33,536.40			
Bank protection—revetment:						
Prior to July 1, 1907		13,101,541			24,000	
During fiscal year ending June 30, 1908—						
James Landing		154,335	21,448.46			
Crain Island					18,780	$2,647.35
Eliza Towhead		123,340	13,076.35			
Total		13,379,216	34,524.81		42,780	2,647.35
Dikes and dams:						
Prior to July 1, 1907						
During fiscal year ending June 30, 1908						
Jetties:						
Prior to July 1, 1907						
During fiscal year ending June 30, 1908						
Dredging:						
Prior to July 1, 1907						
During fiscal year ending June 30, 1908						
Total						
Surveys, examinations, gauges, etc.:						
Prior to July 1, 1907						
During fiscal year ending June 30, 1908						
Total						

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Total cost and work done to June 30, 1908—Continued.

	Ordinary repairs.			Total cost.
	Linear feet.	Square feet.	Cost.	
Hurdles:				
Prior to July 1, 1907	37,690			$6,429,194.83
During fiscal year ending June 30, 1908—				
Crain Island			$2,966.60	2,966.60
Willard			3,358.84	3,358.84
Devil Island	970		12,661.82	12,661.82
Total	38,660		18,987.26	6,439,182.09
Bank protection—mattress:				
Prior to July 1, 1907		1,105,125		
During fiscal year ending June 30, 1908—			3,433.67	
James Landing				
Devil Island		45,690		
Eliza Towhead				
Total		1,150,815	3,433.67	3,028,385.88
				36,970.67
Bank protection—revetment:				37,172.16
Prior to July 1, 1907		2,302,252		
During fiscal year ending June 30, 1908—				
James Landing				
Crain Island				
Eliza Towhead				
Total		2,302,252		
				3,102,527.76
Dikes and dams:				
Prior to July 1, 1907				814,358.33
During fiscal year ending June 30, 1908				
Jetties:				
Prior to July 1, 1907				114,603.53
During fiscal year ending June 30, 1908				
Dredging:				
Prior to July 1, 1907				559,492.56
During fiscal year ending June 30, 1908				83,911.69
Total				643,404.24
Surveys, examinations, gauges, etc.:				
Prior to July 1, 1907				279,393.19
During fiscal year ending June 30, 1908				9,418.41
Total				288,811.60

Recapitulation.

Hurdles	$6,439,182.09
Bank protection	3,102,527.76
Dikes and dams	814,358.33
Jetties	114,603.53
Dredging	642,203.25
Surveys, examinations, gauges, etc	289,327.60
	11,422,202.56

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Property account.

	Value, July 1, 1907.	Debits.	Credits.	Value, June 30, 1908.
Steamer Gen. T. L. Casey	$7,291.16		$7,291.16	
Steamer Gen. J. H. Simpson	13,289.59	$9,045.05	7,951.77	$14,382.87
Steamer Wm. R. King	51,827.01	25,097.09	25,554.61	51,369.49
Dredge No. 2	5,798.00	8,071.60	8,908.69	4,960.91
Dredge No. 3	72,034.37	33,955.70	22,327.10	83,662.97
Dredge No. 4	69,414.79	33,424.56	26,641.14	81,198.21
Dredges Nos. 3 and 4, alterations	21,860.25	9,911.41	31,771.66	
Dredges Nos. 5 and 6, construction	38,671.93	205,537.97		244,209.90
Steam tenders, wood, 5	9,707.60	4,526.40	3,277.47	10,956.53
Steam tenders, steel, 3	37,017.98	1,098.69	3,286.45	34,830.17
Barges, model, 57	92,249.08	1,540.63	14,851.62	78,938.04
Barge, flat, 1	2,705.32		346.88	2,358.44
Store boat, 1	1,167.55		168.57	998.98
Quarter boats, 10	13,384.72	5,767.27	5,245.72	13,906.27
Office and survey boats, 5	9,797.74	435.16	1,851.68	8,381.22
Pile drivers, 21	32,315.92	475.96	9,743.95	23,047.93
Derrick boats, 2	4,512.95	749.91	692.27	4,569.59
Derricks, 2	1,328.61	82.37	274.19	1,136.79
Flats, wood, 70	9,862.41	683.68	2,107.56	8,438.53
Flats, steel, 8	10,919.59	308.19	953.54	10,274.24
Small boats, 97	1,883.77	159.78	431.75	1,611.80
Portable quarters, 29 sections	874.36	100.56	226.61	748.31
Jetty gates	3,457.38		499.16	2,958.22
Engineer depot	20,281.02	2,114.07	5,042.15	17,352.94
Tools and appliances	13,107.01	5,083.55	6,064.83	12,125.73
Boarding outfit	10,022.93	1,811.28	3,099.60	8,734.56
Office furniture	1,110.45		160.32	950.13
Survey instruments	950.07	3.00	138.25	814.82
Total	556,843.46	354,983.83	188,909.70	722,917.59

Material account.

	Value, July 1, 1907.	Debits.	Credits.	Value, June 30, 1908.
Subsistence	$351.80	$25,451.68	$25,624.69	$678.79
Brush	1,475.28	8,728.41	10,203.69	
Piles	7,892.36	1,210.51	4,226.49	4,876.88
Stone, United States quarry		24,785.75	24,785.75	
Stone, contract	451.64	6,042.32	6,493.96	
Rope	16,383.62	4,605.17	285.00	20,703.79
Wire	1,443.66		902.29	541.37
Iron	4,411.51	3,050.51	2,606.16	4,855.86
Nails	484.51	78.96	298.25	265.22
Spikes	574.62	32.10	115.39	491.33
Lumber, miscellaneous	8,671.20	2,715.30	4,824.56	6,561.94
Oakum	504.81		232.30	272.51
Coal	2,744.92	30,359.20	31,363.25	1,740.87
Ice		1,412.34	1,412.34	
Material, miscellaneous	8,661.84	58,758.78	36,270.28	31,150.34
Total	54,551.77	167,231.08	149,644.40	72,138.40

ENGINEER OFFICE, U. S. ARMY, IN ACCOUNT WITH UNITED STATES FROM 1870 TO JUNE 30, 1908.

To allotments, appropriations, etc., prior to June 30, 1908:			
1872–1907.	Allotments for surveys	$55,483.77	
1876–1897.	Special appropriations	401,600.00	
1879–1908.	Miscellaneous receipts	30,161.29	
1872–1908.	Appropriations for general improvement	12,929,999.98	
			$13,417,245.04
June 30, 1908.	Unpaid percentages	22,291.06	
	Unpaid labor	11,374.45	
	Unpaid miscellaneous	7,104.86	
			40,770.37
	Total		13,458,015.41

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June 30, 1908.	By construction between Illinois and Missouri rivers:		
	Piasa Island dam	$37,910.41	
	Piasa Island dam, cutting channel	3,116.86	
	Alton dam	33,740.05	
	Alton dike	126,652.74	
			$201,420.06
	By construction between Ohio and Missouri rivers:		
	Hurdles	$6,439,182.09	
	Bank protection	3,102,527.76	
	Dikes and dams	814,358.33	
	Jetties	114,603.53	
	Dredging	662,203.25	
	Surveys	289,327.60	
			11,422,202.56
	By removing obstructions, Beaver Dam rock		3,902.36
	By Board on Examination and Survey of Mississippi River		10,645.81
	By withdrawn for Office of Chief of Engineers		2,220.50
	By withdrawn for Board of Engineers for Rivers and Harbors		800.00
	By loss account		643,991.59
	By property on hand		722,917.59
	By material on hand		72,138.40
	By Isthmian Canal Commission inspections		13.25
	By Mississippi River Commission, Secretary's Office		1,059.43
	By appropriations unexpended, Mississippi River, Ohio to Missouri rivers		376,703.86
			13,458,015.41

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APPENDIX Z.

IMPROVEMENT OF RIVERS AND HARBORS IN THE ROCK ISLAND, ILLINOIS, DISTRICT.

REPORT OF MAJ. C. S. RICHÉ, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Operating snag boats and dredge boats on Illinois and upper Mississippi rivers.
2. Mississippi River between mouth of Missouri River and Minneapolis. Between Missouri River and St. Paul.
3. Operating and care of Des Moines Rapids Canal and Dry Dock.
4. Mississippi River at Moline, Illinois.
5. Operating and care of lock at Moline, Illinois.
6. Operating and care of Illinois and Mississippi Canal around the lower rapids of Rock River at Milan, Illinois.
7. Illinois and Mississippi Canal; improvement of Rock River pool.
8. Operating and care of Galena River improvement, Illinois.

UNITED STATES ENGINEER OFFICE,
Rock Island, Ill., July 10, 1908.

SIR: I have the honor to transmit the annual report on work in this district for fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

C. S. RICHÉ,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

Z 1.

OPERATING SNAG BOATS AND DREDGE BOATS ON ILLINOIS AND UPPER MISSISSIPPI RIVERS.

The work performed under this appropriation consists chiefly in the removal of snags, wrecks, rocks, and other obstructions to navigation. The operations on the Mississippi River extend from Minneapolis to the mouth of the Missouri River, a distance of 670 miles, and on the Illinois River from its mouth to Copperas Creek, 138 miles.

There belongs to this work the snag boat *David Tipton* (formerly the *Col. A. Mackenzie*), built in 1900, but dredges, drill boats, and tenders are borrowed from other works when required.

Snag boat and dredge boat operations are, and have been for the past thirty-two years, in local charge of Principal Assistant Engineer C. W. Durham, from whose report the following details are taken:

During the past year the snag boat was employed from July 1 to November 2, 1907, and from April 24 to June 30, 1908, in removing snags and other

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obstructions, placing buoys, making surveys and inspections, and otherwise assisting the interests of navigation on the upper Mississippi River between Minneapolis and the mouth of the Missouri River. On account of continuous high water in the Illinois River no work was done in that stream.

From September 27 to October 4, 1907, the snag boat took the Inland Waterways Commission on an inspection trip from St. Paul to Memphis, proceeding down river from Keokuk in company with the *Mississippi*, carrying the President.

Summary.

Designation.	Mississippi River.
Snags and stumps removed	253
Stumps and piles destroyed	68
Leaning trees pulled back	272
Large trees felled (over 8 inches diameter)	1,424
Small trees felled (under 8 inches diameter)	2,071
Buoys placed	1
Sunken barges raised	1
Miles run	5,025

Operations of hydraulic dredge Hecla.—The *Hecla* was employed from September 25 to October 3, 1907, in removing deposits of mud, sand, and gravel from the Keokuk steamboat landings in vicinity of the Diamond Jo and Carnival City packet warehouses. The dredge covered an area of 44,300 square feet and removed 4,428 cubic yards of material, at a cost of 11 cents per yard. From May 1 to 8, 1908, the *Hecla* was employed in removing sand and gravel deposits from along shore above the bridge at Fort Madison. The dredge covered an area of 20,700 square feet and removed 7,830 cubic yards of material. Only a part of the cost of this work was paid from the snag-boat appropriation.

Operations of the Davis hydraulic dredge.—This dredge, hired by the Government, was employed for a portion of the month of June, 1908, in removing mud deposits from the channel in the upper approach to Moline lock.

The total tonnage of the Mississippi River between the Falls of St. Anthony and mouth of Missouri River for the calendar year 1907 was approximately 3,919,440 tons, and the ton-miles 532,899,222. This includes logs and lumber.

ABSTRACT OF APPROPRIATIONS AND ALLOTMENTS.

By act approved March 2, 1867	$96,000
By allotment from appropriation of July 25, 1868	26,000
By allotment from appropriation of 1869	35,640
By act approved—	
July 11, 1870	36,000
March 3, 1871	42,000
June 10, 1872	42,000
March 3, 1873	25,000
June 23, 1874	25,000
March 3, 1875	25,000
August 14, 1876	30,000
June 18, 1878	41,500
March 3, 1879	20,000
June 14, 1880	8,000
March 3, 1881	25,000
By act passed August 2, 1882	25,000
By act approved August 5, 1886	22,500
By act of August 11, 1888, for fiscal year ending—	
June 30, 1889	$25,000
June 30, 1890	25,000
June 30, 1891	25,000
June 30, 1892	25,000
June 30, 1893	25,000
June 30, 1894	25,000
June 30, 1895	25,000
June 30, 1896	25,000
June 30, 1897	25,000
June 30, 1898	25,000
June 30, 1899	25,000
June 30, 1900	24,944
June 30, 1901	25,000
June 30, 1902	25,000
June 30, 1903	25,000
June 30, 1904	25,000
June 30, 1905	25,000
June 30, 1906	25,000
June 30, 1907	25,000
June 30, 1908	25,009
Total	1,024,594

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STATISTICS OF COMMERCE AND NAVIGATION.

Lumber.—The most important business at present carried on in connection with the navigation of the upper Mississippi River and its principal tributaries is the lumber trade, which, although rapidly declining, owing to the disappearance of the pine forests in Minnesota and Wisconsin, gave employment in 1907 to 14 raft boats, which distributed logs from the upper waters to the various mills scattered along the river from Minneapolis to Keokuk, and also brought down, chiefly to points below the Des Moines Rapids, much lumber from the St. Croix River. The manufactures of these mills in 1907 were: White pine lumber, 356,138,000 feet B. M.; and hemlock, 72,336,000 feet B. M.

Lumber manufacture, Upper Mississippi River valley, 1907.

[Value about $23,500,000.]

Locality.	Lumber.	Shingles.	Lath.
	Feet B. M.	*Number.*	*Number.*
Above Minneapolis	513,467,000	9,511,000	59,773,000
Minneapolis	200,288,000	.....	82,000
St. Paul to Missouri River	155,850,000	.....	.....
St. Croix River	106,355,000	4,122,000	19,968,000
Chippewa River	69,981,000	8,022,000	16,149,000
Black River	200,000	.....	.....
Total	1,046,141,000	21,665,000	95,972,000

The larger part of the above was floated for greater or less distance on the Mississippi River either as logs or lumber.

Steamboats and freight.—There were employed between Minneapolis and St. Louis during 1907, 14 raft boats, 20 packets, 26 towboats, 18 ferryboats, 112 pleasure boats, and 20 Government boats; in all, 210 vessels, with a gross tonnage of about 14,280 tons. In addition to the above, there are about 250 unregistered barges of various sizes used for transporting freight and construction material. The principal steamboat lines on the upper Mississippi River are the Diamond Jo, the Eagle, the Carnival City, and the Acme packet companies. The number of passengers carried by all boats (including the ferries, 1,414,121) in 1907 was 2,598,082. The quantity of freight carried by all boats, including the rock and brush loaded on barges and used in Government work and also including logs and lumber floated down the stream, is shown in the following table, together with the ton-miles and approximate valuation:

Upper Mississippi River freight statement for 1907.

Designation.	Tons.	Ton-miles.	Valuation.
Logs	1,928,133	481,433,250	$9,426,715
Rafted lumber, shingles, etc	74,928	30,137,625	1,080,310
Miscellaneous freight	1,519,581	19,021,959	28,858,110
Government material	396,798	2,306,388	198,534
Total	3,919,440	532,899,222	39,563,669

List of steamboats, barges, and rafts passing through various bridges.

Locality of bridge.	Miles from St. Paul.	Steamboats.	Barges.	Rafts.
St. Paul Park	11	965	190	130
Hastings	28	1,058	157	282
Prescott	30	1,594	344	414
Reads	78	834	301	184
Winona	116	1,500	634	300
La Crosse	143	1,242	590	126
Dubuque	265	779	345	96
Sabula	310	377	234	60
Clinton	327	1,521	686	74
Rock Island	363	1,702	1,096	81

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List of steamboats, barges, and rafts passing through various bridges—Cont'd.

Locality of bridge.	Miles from St. Paul.	Steamboats.	Barges.	Rafts.
Keithsburg	417	726	52	54
Burlington	441	1,102	202	169
Fort Madison	462	1,(50	146	93
Keokuk	484	998	196	16
Quincy	521	1,235	474	49
Hannibal	540	604	196	3
Louisiana	568	973	336	12
Alton	652	1,563	168	.....

Internal revenue for the year ending December 31, 1907, collected in districts bordering on the upper Mississippi River.

District.	Office.	Amount.
Minnesota	St. Paul	$1,794,963.65
Second Wisconsin	Madison	990,955.77
Third Iowa	Dubuque	457,806.49
Fourth Iowa	Burlington	531,382.67
Fifth Illinois	Peoria	$2,286,455.33
Eighth Illinois	Springfield	10,420,565.41
Thirteenth Illinois	East St. Louis	520,439.65
First Missouri	St. Louis	8,006,456.45
Total		55,008,745.92

Customs revenue and tonnage for the year ending December 31, 1907.

Port.	Collections.	Tonnage enrolled.	Vessels.
St. Paul, Minn	1,482,845.00	2,761	82
La Crosse, Wis	31.17	2,006	82
Dubuque, Iowa	28,513.69	1,594	17
Rock Island, Ill	47.46	5,737	126
Burlington, Iowa	65.34	2,138	97
St. Louis, Mo.[a]	2,645,766.55	22,868	111
	4,106,769.21	37,104	385

[a] Only a part of the St. Louis statement is applicable to the upper Mississippi.

Summary of expenditures for operating snag boats and dredge boats on Illinois and Upper Mississippi rivers for fiscal year ending June 30, 1908.

Month.	Office expenses, superintendence, and contingencies.	Care, repair, and operating snag boats and dredge boats.						Grand total.
		Labor.	Subsistence.	Fuel.	Expense.	Repairs.	Total.	
1907.								
July	.....	.....	$484.59	$229.49	$42.70	.....	$756.78	$756.78
August	.....	$2,961.88	139.22	84.34	960.94	$712.19	4,858.52	4,858.52
September	.....	.....	380.76	529.98	474.36	309.86	1,694.96	1,694.96
October	.....	1,888.69	143.76	59.13	884.95	.....	2,976.53	2,976.53
November	$81.84	492.85	134.71	210.11	4.40	114.45	956.52	1,087.36
December	75.00	225.00	.....	.....	.....	188.50	413.50	488.50
1908.								
January	75.00	225.00	.....	.....	.....	1,139.41	1,364.41	1,439.41
February	75.00	225.00	.....	.....	.....	807.13	1,032.13	1,107.13
March	75.00	225.00	.....	.....	.....	895.31	1,120.31	1,195.31
April	9.84	.....	.....	96.60	.....	111.19	207.79	217.63
May	382.49	874.20	463.81	232.88	344.64	485.99	2,401.52	2,784.01
June	425.40	3,872.87	355.02	671.81	42.89	1,075.87	6,017.96	6,443.36
Total	1,199.07	10,990.44	2,101.87	2,114.34	2,754.88	5,839.90	23,800.93	25,000.00

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IMPROVEMENT OF MISSISSIPPI RIVER BETWEEN MOUTH OF MISSOURI RIVER AND MINNEAPOLIS, MINNESOTA.—BETWEEN MISSOURI RIVER AND ST. PAUL.

The balance available July 1, 1908, will be applied at the various localities indicated in the annual project, in the construction of dams and shore protections and in auxiliary dredging, both by hired labor and contract.

The work will be done in accordance with the 6-foot channel project adopted by Congress March 2, 1907, the estimate for which is on page 1559, Report Chief of Engineers for 1907. The full project is published in Document No. 341, Fifty-ninth Congress, second session.

GENERAL IMPROVEMENT.

St. Paul to Winona, 116 miles.—By hired labor and use of Government plant, work was carried on in 1907 chiefly at Beef Slough bar above Alma (miles, 85 to 88 from St. Paul), where 9 wing dams were built and 15 repaired. Two dams were lengthened and 7 pieces of shore protection repaired. A small amount of miscellaneous work was done in vicinity of Buffalo City Slough, Zumbro River, and Minneiska.

In the above-mentioned work 27,031.9 cubic yards of rock and 35,394.6 cubic yards of brush were put in place, at a cost of $0.936 per cubic yard, including superintendence, office expenses and plant charges. Ninety-two buoys were placed to mark the ends of dams near the channel.

No construction work has been performed during 1908 to June 30, but considerable progress has been made in the establishment of a boat yard at South Stillwater, in the installation of machinery and collection of materials for building barges and dredges.

Winona to Wisconsin River, 96 miles.—All work was done by hired labor and Government plant. Operations were carried on in 1907 in vicinity of Winona (miles, 117–118), Dresbach Island (miles, 138), and River Junction (miles, 142–143). Six wing dams were built and 1,845 linear feet of shore protection; 10 dams were raised, repaired, and extended to new channel line.

There were put in place 26,603.1 cubic yards of rock and 52,372.5 cubic yards of brush, at a cost of $0.861 per cubic yard, including all charges. The rock used in the work was furnished by the United States quarry at La Moille, at a cost of $0.80 per cubic yard, loaded on barges.

Sounding surveys were made at several localities, covering about 14 miles of river, and 28 buoys were placed at ends of dams.

Considerable progress was made in the establishment of a boat yard at Fountain City, in collecting and installing machinery and in procuring materials for the construction of a dredging plant and 20 barges.

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Wisconsin River to Savanna, 95 miles.—All work was done by hire labor and use of Government plant. In Guttenberg Channel a Cassville Slough were built 2 wing dams and 1 closing dam, wh 2 closing dams were commenced, and some progress was made on others. At Fulton 2 wing dams were built.

There were put in place in above-mentioned work 19,816 cub yards of rock and 35,817 cubic yards of brush, at a cost, includi all charges, of $0.846 per cubic yard.

Sounding surveys were made at Fulton, North Buena Vista t Hurricane Island, at Guttenberg Channel, Spechts Ferry to Dubuq and Apple River to Savanna, covering in all about 38 miles of riv

In 1908 work under contract with A. J. Whitney was commenc on a closing dam in Cassville Slough, but was discontinued in M on account of high water. There were put in place under this co tract 1,459.9 cubic yards of rock and 3,522.7 cubic yards of brush.

Rock Island Rapids.—Work on the 6-foot channel project w carried on by drill boat *No. 6*, dredges *Ajax*, *Geyser*, and *Mogul*, blasting rock and in removing broken rock and other débris from t projected channel, chiefly at lower approach to lock. There we 800 solid cubic yards rock blasted and removed, 200 yards blast only, 4,622 cubic yards broken rock dredged and removed, as al 12,607 cubic yards loose rock, fire clay, and gravel. The total cost o this work was $10,673.40, but no accurate estimate of the cost of eac item could be made.

Preparations were made during the season of 1907 for the con struction of a concrete core in the dam extending up river from hea of Benhams Island. A storehouse for cement was erected, tools an machinery were collected and installed on barges, lumber and cement were procured, but no actual work on the dam was done. The cost o these preparations was $6,525.33.

The buoys of the system, numbering 42, were put out in April an taken up in December, 1907. A substantial water gauge was estab lished at Le Claire, and a resurvey of Moline pool was made.

In 1908 to June 30 dredges *Ajax*, *Geyser*, *Apache*, and *No. 2* were variously employed in removing broken rock and other débris from the channel. A commencement of the core wall was made in June, but was interrupted by high water.

Rock Island to Burlington, 79 miles.—The work of 1907 was per formed under contract with Capt. A. Kirchner, of Fountain City, Wis. All of the season's work was in the vicinity of Horse Island and Buffalo, and consisted in the construction of 8 wing dams, some repairs to 8 wing dams, to Andalusia pier, and the shore protection on head of Andalusia Island.

There were put in place 11,907.1 cubic yards rock and 19,167.5 cubic yards brush, at a cost, including all charges of $0.986 per cubic yard.

All work of the season was performed in accordance with the 6-foot channel project, the channel, however, being reduced in width from 1,000 to 800 feet from head to foot of Andalusia Slough, in order to permit a portion of that slough to remain open.

In 1908 the above-mentioned contract was completed with construction of two wing dams near Buffalo and a second contract was com-

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menced. This latter contract, on which some shore protection above New Boston had been built, was interrupted by high water during latter part of May, and had not been resumed at the end of the fiscal year.

A small survey party was at work from June 24, 1907, to August 2, 1907, and made a continuous survey, which was plotted in the field, from Crescent Bridge to Blanchards Island, 31 miles. Special examinations were made by this party at ten different localities.

Burlington to Hannibal, 98 miles.—This division includes the Des Moines Rapids Canal. Some small repairs were made to two wing dams above Fort Madison by hired labor, the material consisting of 144 cubic yards rock, being put in place at a cost of $0.74 per cubic yard.

Under contract with Capt. A. V. Fetter, the following work was performed between Curtis Point (mile 501) and Marion City (mile 532): Shore protection, Tully Island, 390 linear feet; shore protection, Polly Island, 1,400 linear feet; shore protection, Curtis Point, raised to top of bank; 1 wing dam built and three closing dams repaired (miles 502–508); shore protections on Tully Island and Fabius Island repaired; and 1,500 linear feet of shore protection built on Missouri shore below Bayou St. Charles.

There were put in place under this contract 13,813.6 cubic yards rock and 15,688.7 cubic yards brush, at a cost, including all charges, of $1.127 per cubic yard.

A survey party in the field from June 17 to July 24, 1907, made examinations in vicinity of Canton and Smoot chutes, at Curtis Point, and at Quincy bar, covering 14½ miles of river.

In 1908 Captain Fetter completed his contract of the previous season, and commenced a new one. Some shore protection was built on Fabius Island, 1,499 linear feet of shore protection contiguous to the Warsaw to Quincy levee was raised to top of bank, and a wing dam was commenced. Work was discontinued May 15 on account of a broken wheel shaft on the contractor's towboat, and not resumed prior to July 1, because of high water.

Hannibal to Missouri River, 118 miles.—Work was performed by hired labor and use of Government plant in vicinity of Elsah (miles 638–644) and in vicinity of Clarksville (miles 575–583). At the first-named locality one closing dam was repaired, one wing dam was lengthened and extended 1,400 feet to Eagle Nest Island, and two wing dams were built. In vicinity of Clarksville the shore protections on Missouri shore below Amaranth Island and below the city were completed; shore protections on head of Pharrs Island and below Dam 4 were repaired, and shore protections were built opposite foot of Island 460, on Missouri shore (1,400 linear feet), on Island 462 (1,050 linear feet), on Clarksville Island (550 linear feet), and on Missouri shore below Clarksville (2,500 linear feet). There were put in place 32,911.9 cubic yards rock and 35,874.8 cubic yards brush, at a cost of $0.995 per cubic yard.

During the season of 1907 surveys were made at Hamburg, in vicinity of Eagle Nest Island, at Alton Slough, head of Gilbert Island to head of Blackbird Island, head of Mosiers Island to head of Westport Island, Sterling Landing to foot of Turkey Island—in all about 32 miles of river.

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Mr. Richards, assistant engineer in local charge, says:

The localities that will probably need attention in 1908 are vicinity of Gilberts Island, Stag Island, Hamburg, and Turkey Island. At present there is no available harbor for the fleet in this division, the nearest safe harbor being Quincy Bay, 18 miles above Hannibal Bridge. It is considered economical and desirable to winter the fleet at some point in this division, and the most advantageous point for such a harbor is at Alton Slough, which could be made available by very little dredging at the mouth of the slough.

There has been expended on the plant belonging to general improvement to December 31, 1907, $1,093,790.66, and its estimated value on January 1, 1908, was $161,499.52.

Summary showing localities, amounts, and cost of regular construction works in 1907 between St. Paul and mouth of Missouri River.

Method and locality.	Material.			Cost of work.	Average cost per cubic yard on barges.	Average cost per cubic yard for towing.	Average cost per cubic yard for putting in place.	Average cost per cubic yard for general superintendent's office expense and inspection.	Average cost per cubic yard for local superintendent.	Average cost per cubic yard for plant.	Average cost per cubic yard in place.
	Rock.	Brush.	Total.								
Hired labor.	Cu. yds.	Cu. yds.	Cu. yds.								
St. Paul to Winona	27,031.9	35,394.6	62,426.5	$58,472.67	$0.421	$0.110	$0.254	$0.033	$0.058	$0.060	$0.936
Winona to Wisconsin River	26,603.1	52,372.5	78,975.6	67,994.72	.351	.161	.212	.029	.022	.068	.861
Wisconsin River to Savanna	19,816.0	35,817.0	55,633.0	47,058.81	.331	.158	.165	.027	.044	.076	.801
Hannibal to Missouri River	32,911.9	35,874.8	68,786.7	68,457.10	.460	.157	.202	.084	.063	.078	.965
Contract.											
Rock Island to Burlington[a]	11,907.1	19,167.5	31,074.6	30,641.70	.....	.....	.....	.059	.....	.....	.986
Burlington to Hannibal[a]	18,813.6	15,688.7	29,502.3	33,240.39	.....	.....	.....	.083	.....	.....	1.127
	132,083.6	194,315.1	326,398.7	305,865.39	.....	.....	.....	.....	.....	.....	.937

[a] Not completed.

Average cost per cubic yard in place, day labor work $0.910
Average cost per cubic yard in place, contract work 1.054

SPECIAL WORK.

Warsaw to Quincy levee.—In local charge of United States Civil Engineer M. Meigs. Under contract with A. V. Fetter, 1,450 linear feet of shore protection on Illinois shore, opposite Buzzard Island, was raised from a 7-foot stage to 14 feet, and a wing dam 630 feet long, running out from the Illinois shore, was built. The balance of funds available was expended on above work.

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ALLOTMENTS.

By sundry civil act approved—	
March 2, 1895	$85,500.00
June 4, 1897	5,000.00
March 3, 1899	5,000.00
By river and harbor act approved June 13, 1902	10,000.00
Total	105,500.00

Flint Creek to Iowa River levee.—In charge of Principal Assistant Engineer C. W. Durham. No work was done during the past year. An allotment of $10,000 made by act of May 27, 1908, will be expended in protecting abrading bank in the Iowa River and Huron Slough.

ALLOTMENTS.

By sundry civil act of—	
March 2, 1895	$85,000.00
June 3, 1896	75,000.00
June 4, 1897	50,000.00
July 1, 1898	40,000.00
May 27, 1908	10,000.00
Total	310,000.00
Balance unexpended July 1, 1908	10,443.52

Bar at Quincy.—In local charge of United States Civil Engineer M. Meigs. No field or construction work was done during the year.

ALLOTMENTS.

By river and harbor act of June 30, 1896	$10,000.00
By sundry civil act of March 3, 1899	10,000.00
By river and harbor act of June 13, 1902	20,000.00
Total	40,000.00
Balance unexpended July 1, 1908	640.81

Harbor of Refuge below Davenport, Iowa.—In local charge of Principal Assistant Engineer C. W. Durham. No work was done during the past year.

ALLOTMENTS.

By sundry civil act of March 3, 1899	$10,000.00
By river and harbor act of June 13, 1902	5,000.00
Total	15,000.00
Balance unexpended July 1, 1908	1,931.95

Channel at Clinton, Iowa.—In local charge of Assistant Engineer S. Edwards. Two wing dams, built in 1907 and reported last year, were paid for, and the balance of the allotment was expended.

ALLOTMENT.

By sundry civil act of March 3, 1899	$25,000.00

Channel and harbor at Hannibal, Mo.—In local charge of Assistant Engineer A. L. Richards. No work was done during the past year.

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ALLOTMENT.

By river and harbor act of June 13, 1902	$15,000.00
Balance unexpended July 1, 1908	237.32

Harbor at Muscatine, Iowa.—In local charge of Principal Assistant Engineer C. W. Durham. In June and September, 1907, unsuccessful attempts were made with two forms of hydraulic dredge to deepen the harbor adjacent to the harbor lines. In 1908 a dipper dredging plant was engaged from March 16 to May 20, with good results. The area covered was 166,300 square feet, the quantity of material removed, 44,750 cubic yards, and the cost per cubic yard, exclusive of plant charges, 13 cents.

APPROPRIATIONS AND ALLOTMENTS.

By river and harbor act of—	
March 3, 1879	$7,500.00
June 14, 1880	7,500.00
March 3, 1881	2,500.00
August 2, 1882	2,500.00
By sundry civil act of June 4, 1897	15,000.00
By river and harbor act of June 13, 1902	10,000.00
Total	45,000.00
Balance unexpended July 1, 1908	1,851.40

Harbor of refuge at Pepin, Wis.—In local charge of Assistant Engineer J. D. DuShane. No work was done during the past year.

ALLOTMENTS.

By river and harbor act approved—	
June 13, 1902	$14,000.00
March 3, 1905	11,500.00
Total	25,500.00
Balance unexpended July 1, 1908	4,945.34

Dredging at harbors and at landing places.—Under above head has been appropriated $100,000, to be expended in two years under approved allotments for various localities. At Dubuque ice harbor in May and June, 1907, dipper dredge *Phoenix* with double crew removed all deposits and restored the 6-foot grade. There was dredged at Dubuque 37,265 cubic yards of mud, at a cost of $4,211.49, or about 11.3 cents per yard.

At Fulton dipper dredge *Phoenix* with double crew was employed in removing deposits at the steamboat landing from June 18 to July 31, 1907. An area of 182,240 square feet was dredged to a depth of 6 feet at low water. The quantity of material, chiefly sand, removed was 32,767 cubic yards, and the cost, $4,014.95, or about 10.7 cents per yard.

At Moline dipper dredge *Mogul* was employed under contract with T. B. Davis in removing deposits from the harbor from July 15 to November 13, 1907. The dredging, which was mostly along shore, was difficult on account of an irregular rock bottom very near to

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grade and the refractory nature of the material, consisting of a sticky mud, broken rock, gravel, and a variegated assortment of brickbats, tin cans, etc. The cost of the dredging done by the *Mogul* was $12,780.56, the yardage 53,758.8, and the average cost per yard 22.6 cents. Suction dredge *Geyser* was also employed at Moline Harbor at different times in 1907, as also dipper dredges *Vulcan* and *Apache*. The combined spoil of these dredges was 41,672 cubic yards, and the cost of the work $7,850.02, or 18.8 cents per cubic yard. The *Mogul* has also been employed for about two months in 1907, and the expenditure at Moline to date is $23,589.97.

At Andalusia in 1907 the Davis suction dredge, hired by the Government, was employed from September 17 to October 18 in removing deposits at the steamboat landing. A cut, 110 feet wide and 173 feet long, was made on the south side of the landing pier, the grade of excavation being 6 feet at the shore end, where rock was encountered. The material, 3,152 cubic yards, chiefly mud and sand, was placed on the pier, widening it and raising it so that as now completed it is 260 feet long, 50 feet wide, and 10 feet above low water. The cost of the work was $1,337.27.

In 1908, during May and June, dipper dredge *Vulcan* was employed in removing obstructions from La Crosse Harbor, with an expenditure of $1,871.52, and suction dredge *Hecla* was engaged for a time in June at Hamburg, at a cost of $2,505.42, including some preparatory repairs made in 1907. The total amount expended at all the selected harbors to June 30, 1908, is $37,842.51.

ALLOTMENTS.

By river and harbor act of March 2, 1907	$50,000
By sundry civil act of May 27, 1908	50,000
	100,000

Summary of expenditures for calendar year ending December 31, 1907, for improving Mississippi River from mouth of Missouri River to St. Paul, Minn.

St. Paul to Winona, hired labor	$54,735.74
Winona to Wisconsin River, hired labor	65,251.82
Wisconsin River to Le Claire, hired labor	39,919.92
Rock Island Rapids, hired labor	23,851.45
Hannibal to Missouri River, hired labor	63,097.35
Rock Island to Burlington, contract	30,620.28
Burlington to Hannibal, contract	33,324.41
Dredging at harbors, contract	12,805.47
Dredging at harbors, hired labor	16,320.88
Surveys and gauges	13,417.38
Care, repair, and construction of plant	49,165.94
Harbor at Muscatine	1,748.93
Channel at Clinton	2,928.85
Harbor of refuge below Davenport	21.25
Bar at Quincy	21.84
	407,231.51

In above statement the retained percentage on contracts December 31, 1907, is added.

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Net expenditures on various sections of the river, harbors, levees, etc., betwe Minneapolis and the Missouri River, from commencement of improvement June 30, 1908.

[4½-foot project.]

Locality.	Distance.	Amount.	Per m
	Miles.		
St. Paul to Minneapolis	.....	$59,112.46	.....
St. Paul to Prescott	30	671,796.35	$
Prescott to Lake Pepin	26	338,219.92	
Foot of Lake Pepin to Alma	11	544,247.77	
Alma to Winona (Chicago & Northwestern bridge)	28	790,102.75	
Winona to La Crosse (Chicago, Milwaukee and St. Paul bridge)	28	890,860.46	
La Crosse to McGregor bridge	64	667,672.80	
McGregor to Dubuque (Illinois Central bridge)	57	548,278.43	
Dubuque to Clinton (Chicago and Northwestern bridge)	62	467,268.48	
Clinton to Le Claire	21	89,830.24	
Rock Island Rapids	14	694,856.86	
Rock Island (U. S.) bridge to Keithsburg bridge	55	402,179.06	
Keithsburg to Nashville	59	934,356.20	
Keokuk bridge to Quincy bridge	37	643,024.12	
Quincy to Clarksville	56	1,066,951.96	
Clarksville to Cap au Gris	37	930,199.56	
Cap au Gris to Illinois River	24	441,562.26	
Illinois River to Missouri River	23	487,485.96	
Harbor of refuge at Pepin	.....	20,554.66	.....
Ice harbor at Dubuque	.....	15,770.65	.....
Channel and harbor at Clinton	.....	25,000.00	.....
Harbor of refuge at Davenport	.....	13,068.05	.....
Harbor at Muscatine	.....	28,148.60	.....
Bar at Quincy	.....	26,178.21	.....
Channel and harbor at Hannibal	.....	14,762.67	.....
Flint Creek to Iowa River levee	.....	299,556.48	.....
Warsaw to Quincy levee	.....	105,500.00	.....
Various harbors, bays, channels, and levees[a]	.....	501,658.50	.....
Surveys, gauges, and meter work	.....	261,162.16	.....
Plant, at estimated value	.....	159,733.76	.....
Total expended	.....	12,099,152.38	.....
Available for various harbors	.....	10,050.35	.....
Total appropriated	.....	12,109,202.73	.....

[a] The amounts expended at each harbor, bay, etc., under this appropriation, as al additional amounts under special appropriations, are given in Report of Chief of E neers for 1906, page 1617.

APPROPRIATIONS.

Under former projects from June 18, 1878, to June 30, 1906, inclusive, and under the following heads: St. Paul to Des Moines Rapids, Minneapolis to Des Moines Rapids, Des Moines Rapids to Illinois River, Ohio River to Minneapolis, Ohio River to St. Paul, and Missouri River to St. Paul, aggregating $12,157,500.0

Less amount transferred to work at Lock and Dam No. 2, Mississippi River, between Minneapolis and St. Paul (act August 18, 1894) 49,877.6

12,107,622.3

Received from sale of property 1,580.3

12,109,202.7

Of this amount there is a balance remaining of $10,050.35 belonging to various harbors.

FOR CURRENT 6-FOOT CHANNEL PROJECT.

Missouri River to Minneapolis:

By act approved March 2, 1907 ..... $500,000.0

By act approved May 27, 1908 ..... 500,000.0

1,000,000.0

June 30, 1908, received from sale of maps, etc 126.71

1,000,126.71

NOTE.—A detailed statement of appropriations under original project may be found on page 1567, report of Chief of Engineers for 1907.

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Money statement.

July 1, 1907, balance unexpended	$713,480.18
Amount appropriated by sundry civil act approved May 27, 1908	500,000.00
Receipts from sales	126.71
	1,213,556.89
June 30, 1908, amount expended during fiscal year for works of improvement	572,863.52
July 1, 1908, balance unexpended	640,693.37
July 1, 1908, outstanding liabilities	53,974.23
July 1, 1908, balance available	586,719.14
July 1, 1908, amount covered by uncompleted contracts	102,669.20
Amount (estimated) required for completion of existing project	19,000,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	1,500,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

Estimate for a 6-foot channel at low water, Mississippi River, St. Paul to Missouri River, under current project showing amounts already expended under each item.

Division.	Estimate.		Expended to June 30, 1908.	
St. Paul to foot of Lake Pepin:				
Dams and shore protections	$702,675			
Repairs to existing work	163,350	$1,058,025		
Dredging	192,000			
Lake Pepin to Winona:				
Dams and shore protections	870,750			
Repairs to existing work	144,285	1,308,035	$15,894.40	$27,396.79
Dredging	288,000		11,502.39	
Winona to Wisconsin River:				
Dams and shore protections	2,316,225			
Repairs to existing work	76,500	2,632,725	26,127.85	29,900.69
Dredging	240,000		3,772.84	
Wisconsin River to Savanna:				
Dams and shore protections	2,108,250			
Repairs to existing work	40,300	2,316,750	22,748.76	24,532.98
Dredging	168,000		1,784.22	
Savanna to Rock Island Rapids:				
Dams and shore protections	1,460,349			
Repairs to existing work	20,250	1,576,599		
Dredging	96,000			
Rock Island Rapids:				
Canal and rock excavation		3,099,080	25,670.71	25,670.71
Rock Island to Burlington:				
Dams and shore protections	1,932,918			
Repairs to existing work	72,000	2,200,918	18,057.33	21,807.55
Dredging	96,000		3,750.22	
Rock excavation	100,000			
Burlington to Montrose:				
Dams and shore protections	512,163			
Repairs to existing work	63,000	623,163		
Dredging	48,000			
Des Moines Rapids:				
Dam above guard lock	9,000	355,800		
Rock excavation	346,800			
Keokuk to Hannibal:				
Dams and shore protections	1,012,764			
Repairs to existing work	87,750		13,676.20	
Dredging	48,000	1,246,514	5,187.81	18,864.01
Rock excavation	98,000			
Hannibal to Missouri River:				
Dams and shore protections	2,122,945			
Repairs to existing work	270,446	2,717,391	23,372.58	24,111.14
Dredging	324,000		738.56	
Maintenance during construction		870,000		
Total of project		20,000,000		

Add for construction and repair of plant (not distributed)	$153,781.63
Add for dredging at harbors and landing places not in project	33,305.35
Add for advances to Isthmian Canal Commission, to be refunded	112.84
Total expended	359,483.69

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Z 3.

OPERATING AND CARE OF DES MOINES RAPIDS CANAL AND DRY DOCK.

The Des Moines Rapids Canal was in use from July 1 to November 16, 1907, and from March 18 to June 30, 1908, a period of 243 days. The dry dock was in constant use during the entire fiscal year. United States Civil Engineer M. Meigs, who is in local charge of the canal, says in his annual report:

The whole of the season of 1908 up to June 30 has been marked by high water, and the lower lock gates have stood open from May 29, 1908, to the present time, a longer time than ever before in the history of the canal. Owing to the high water, all rafts have gone outside of the canal, and in 1908 most of the packets. This shows in the small traffic statement, although it is thought the actual commerce of the river is quite up to that of last year. * * * The repairs to locks were nominal, but at the dry dock extensive improvements and additions to the machinery were made. * * * No repairs were made to the sluice at Sandusky or to the canal embankment. * * * Suction dredge *Hecla* was employed removing deposits from the canal from July 1 to November 7, 1907, and, with the exception of about three weeks, from April 1 to June 30, 1908. * * * A furious storm on May 26, 1908, caused a serious flood in the canal, which flowed unchecked over the gates of the middle and lower locks, and was discharged by forcing open the guard-lock gates. This storm in one night closed the canal to navigation by Prices Creek at Sandusky throwing in and across the canal a bar containing more than 60,000 cubic yards of sand, gravel and small rock. * * * The *Hecla* removed from the canal during the year 249,556 cubic yards of mixed material, which is 100,000 cubic yards more than was dredged in the previous year. The dredging done has barely kept the canal in fair condition, and there are still several hundred thousand yards of sediment that should be cleaned out. The canal is not as free from deposit as it was in 1878, although since that date there has been taken from the canal 2,577,339 cubic yards, which is the aggregate since the canal opening. * * * The machine shop at lower lock and the dry dock were kept busy during the entire year.

APPROPRIATIONS AND ALLOTMENTS.

By act approved—	
April 30, 1878	$7,500.00
June 18, 1878 (allotment)	32,500.00
March 3, 1879	40,000.00
June 14, 1880	30,000.00
March 3, 1881, expended during fiscal year ending—	
June 30, 1882	41,771.17
June 30, 1883	77,926.79
June 30, 1884	48,283.42
July 5, 1884, expended during fiscal year ending—	
June 30, 1885	44,506.50
June 30, 1886	43,009.53
June 30, 1887	42,152.84
June 30, 1888	42,802.35
June 30, 1889	38,885.37
June 30, 1890	43,995.80
June 30, 1891	44,998.20
By act approved—	
July 5, 1884, expended during fiscal year ending—	
June 30, 1892	$43,968.02
June 30, 1893	57,057.22
June 30, 1894	55,356.45
June 30, 1895	41,052.90
June 30, 1896	37,555.21
June 30, 1897	33,440.54
June 30, 1898	38,504.95
June 30, 1899	35,118.35
June 30, 1900	39,120.73
June 30, 1901	48,595.91
June 30, 1902	41,805.50
June 30, 1903	40,623.37
June 30, 1904	45,161.60
June 30, 1905	43,668.33
June 30, 1906	49,948.65
June 30, 1907	37,698.97
June 30, 1908	42,007.60
Total expended	1,304,018.15

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Expenditures for operating and care of Des Moines Rapids Canal for fiscal year ending June 30, 1908.

Month.	Office and administration.				Canal and locks.			
	Salaries.	Supplies.	Miscellaneous.	Total.	Labor.	Supplies.	Current repairs.	Total.
1907.								
July	$425.00	.....	.....	$425.00	$1,280.00	$10.62	$27.25	$1,317.87
August	425.00	$8.76	$20.30	449.06	1,308.95	215.78	196.57	1,716.30
September	425.00	.....	.....	425.00	196.11	121.89	799.41	1,117.41
October	425.00	.....	2.00	427.00	2,521.25	116.56	432.49	3,070.30
November	.....	18.85	153.30	172.15	.....	28.21	7.25	35.46
December	850.00	90.00	10.25	950.25	1,649.77	268.27	462.41	2,380.45
1908.								
January	425.00	.....	21.28	446.28	1,638.97	16.51	500.64	2,156.12
February	425.00	8.58	19.00	447.58	902.00	2.00	1,357.59	2,261.59
March	425.00	6.50	.....	431.50	1,162.70	30.64	25.04	1,218.38
April	515.00	.....	12.27	527.27	106.58	.....	672.33	777.91
May	375.00	.....	119.21	494.21	2,628.69	45.80	48.38	2,717.87
June	485.00	10.00	45.27	540.27	1,301.20	259.14	415.17	1,975.51
Total	5,200.00	182.64	402.86	5,735.52	14,690.22	1,115.42	4,989.53	20,745.17

Month	Dredging canal.				Grand total.
	Labor.	Supplies.	Current repairs.	Total.	
1907.					
July	$41.00	$68.60	$37.60	$147.20	$1,890.07
August	2,075.77	561.16	47.09	2,684.02	4,849.38
September	40.00	340.31	117.48	497.79	2,040.20
October	1,795.61	1,138.42	37.02	2,971.05	6,468.35
November	875.42	291.67	29.94	1,197.03	1,404.64
December	.....	460.09	213.31	673.40	4,004.10
1908.					
January	150.00	417.97	410.34	978.31	3,580.71
February	150.00	.....	336.44	486.44	3,195.56
March	672.79	590.86	142.79	1,396.44	3,046.32
April	.....	234.27	178.60	412.87	1,718.05
May	766.23	289.21	279.16	1,334.60	4,546.68
June	1,091.41	1,143.88	512.52	2,747.76	5,268.54
Total	7,658.23	5,526.39	2,342.29	15,526.91	42,007.60

Traffic statement of the Des Moines Rapids Canal for the fiscal year ending June 30, 1908.

Month.	Steamboats.		Barges.		Passengers.	Merchandise.	Grain.
	Commercial.	Government.	Commercial.	Government.			
1907.						*Tons.*	*Bushels.*
July	118	29	12	17	5,309	2,553	200
August	180	20	13	2	11,581	3,586	.....
September	134	32	13	18	2,483	1,612	.....
October	294	17	10	13	3,699	905	.....
November	58	14	5	19	194	348	.....
1908.							
March	28	28	5	10	105	113	.....
April	103	9	28	9	758	1,249	.....
May	187	15	9	13	1,419	884	.....
June	160	24	9	23	2,699	198	.....
Total	1,107	188	99	124	28,247	11,448	200

Month.	Lumber.	Logs.	Laths.	Shingles.	Lockage at one look.
1907.	*Feet.*	*Feet.*	*Number.*	*Number.*	
July	.....	.....	.....	.....	145
August	3,000,000	.....	1,000,000	1,000,000	170
September	640,640	1,000,000	.....	.....	167
October	.....	2,200,000	.....	.....	147
November	.....	.....	.....	.....	67
1908.					
March	.....	.....	.....	.....	85
April	.....	.....	.....	.....	107
May	.....	.....	.....	.....	84
June	.....	.....	.....	.....	.....
Total	3,640,640	3,200,000	1,000,000	1,000,000	922

Total boats, 1,290; total barges, 223.

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Z 4.

IMPROVEMENT OF MISSISSIPPI RIVER AT MOLINE, ILLINOIS.

For statement of the approved project, see page — of this report.

The amount expended during the year was used for rock excavation in the upper and lower approaches to the lock, in the building of the dam and back fills, in raising, strengthening, and repairing Moline dike, in dredging mud from the upper approach, in the completion of the lock, and removal of the cofferdam.

The lock construction was in local charge of Junior Engineer J. B. Bassett, and the remainder of the work on this improvement in charge of Assistant Engineer J. C. McElherne. The lock itself was built under continuous contract with the Dravo Contracting Company, of Pittsburg, Pa., but all other work was done by hired labor and use of Government plant.

At the lock in 1907 all the contract work was finished, as also the north backfill, the splay walls, houses for motors and electric wiring. A portion of the cofferdam was removed and the lock was opened in December. In 1908 the south back fill was practically completed.

The main dam, the stated repairs to the Moline dike and dredging in Moline pool, and the rock excavation in the lower approach were completed in 1907, and further progress was made in the rock excavation in the upper approach. Three dipper dredges, two suction dredges, one boom dredge, and two steam drill boats were employed for various periods of time in 1907.

In 1908, 2 drill boats and 2 dipper dredges have been at work on rock excavation in the upper approach since the opening of navigation.

In 1907 the rock broken up in the two approaches to the lock was approximately 6,850 cubic yards, and the broken rock dredged 32,076 cubic yards, equivalent to about 16,000 solid cubic yards.

The cost of rock excavation in 1907 was about $4.43 per solid cubic yard.

In 1908 to June 30 there has been broken up by blasting 3,666 solid cubic yards, at an average cost of $3.60 per yard; there has been dredged and removed about 5,166 solid cubic yards, at a cost of $0.85 per yard, the average cost of rock excavation being about $4.45 per yard.

Money statement.

July 1, 1907, balance unexpended	$150,647.71
For refundment of overpayment	1.25
	150,648.96
June 30, 1908, amount expended during fiscal year for works of improvement	134,618.66
July 1, 1908, balance unexpended	16,030.30
July 1, 1908, outstanding liabilities	471.41
July 1, 1908, balance available	15,558.89

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APPROPRIATIONS.

By act approved—	
March 3, 1905	$100,000
June 30, 1906	150,000
March 4, 1907	136,000
Total	386,000

Z 5.

OPERATING AND CARE OF LOCK AT MOLINE, ILLINOIS.

During the past fiscal year the lock was in operation from March 18 to June 30, 1908, a period of 105 days.

A lighting system was designed and installed, and the backfills were practically completed. About 90 per cent of the traffic reported was due to Government boats working in vicinity of the lock.

There are no outstanding liabilities.

ALLOTMENT.

By act approved July 5, 1884, expended during fiscal year ending June 30, 1906	$5,000

Summary of expenditures for operating and care of Moline Lock for the fiscal year ending June 30, 1908 (six months).

Month.	Superintendence, office expenses, supplies, engineering, and contingencies.	Operating.		Repairs.	Total.
		Labor.	Supplies.		
1908.					
January		$465.66			$465.66
February		331.67	$198.25		529.92
March	$15.00	625.01	81.35		721.36
April	12.25	288.51		$8.87	309.63
May	50.00	695.26	41.43	52.68	839.37
June	1,204.70	479.33	98.06	156.00	1,933.09
Total	1,281.95	2,885.44	414.09	217.55	4,799.08

COMMERCIAL STATISTICS.

Traffic statement of the Moline Lock for the fiscal year ending June 30, 1908.

Month.	Commercial steamers and barges.		Government steamers and barges.		Number of passengers.	Tons of freight.		Lockages.
	Number.	Tons.	Number.	Tons.		Commercial.	Government.	
1908.								
March	5	146	81	3,983			340	32
April	15	615	387	22,631	19		6,316	202
May	55	3,243	635	36,987	1,960	152	8,591	316
June	78	4,122	268	15,135	2,075	381	3,467	175
Total	153	8,126	1,371	78,741	4,054	533	18,714	725

Total number of steamers, 810; total number of barges, 714; total tons of freight, 19,247.

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Z 6.

OPERATING AND CARE OF ILLINOIS AND MISSISSIPPI CANAL AROUND LOWER RAPIDS OF ROCK RIVER, AT MILAN, ILLINOIS.

During the past year the canal was in operation from July 1 to November 30, 1907, and from March 18 to June 30, 1908, a period of 258 days, during 32 days of which Lock 37 was flooded by backwater from the Mississippi River. Repairs to locks, gates, buildings, bridges, and lock houses were nominal. U. S. hydraulic dredge *Geyser* removed deposits of sediment above Lock 35 (2,650 cubic yards) and below Lock 37 (4,845 cubic yards). Lumber for bridge repairs was procured, and for the two steel sluice gates for the Mill Creek dam and that at Lock 35. In the case of the United States *v.* G. W. Griffin, for interference with work of cutting brush in South Slough, a permanent injunction against Griffin was obtained in the Federal court at Peoria.

There are no outstanding liabilities.

ALLOTMENTS.

By act approved July 5, 1884, expended:

During fiscal year ending—		During fiscal year ending—	
June 30, 1895	$225.00	June 30, 1903	$11,398.94
June 30, 1896	5,309.17	June 30, 1904	13,198.47
June 30, 1897	4,752.46	June 30, 1905	13,601.96
June 30, 1898	4,502.39	June 30, 1906	9,694.47
June 30, 1899	3,304.92	June 30, 1907	8,423.46
June 30, 1900	5,379.84	June 30, 1908	13,428.19
June 30, 1901	4,806.18		
June 30, 1902	11,014.93	Total	109,070.38

Summary of expenditures for operating and care of western section Illinois and Mississippi Canal for fiscal year ending June 30, 1908.

Month.	Superintendence, office expenses, supplies, engineering, and contingencies.	Operating and care, locks and bridges.	Repairs.	Dredging.	Total.
1907.					
July		$339.00			$339.00
August			$112.42	$150.49	262.91
September	$12.00	363.00	1,017.01	1,009.22	2,401.23
October	126.18	821.99	1,650.88	466.20	3,065.25
November	70.00	455.00	459.93	194.83	1,179.76
December	12.70	307.00	106.06		425.76
1908.					
January		325.00	77.90		402.90
February		349.50			349.50
March	12.00	298.92	1,902.15		2,213.07
April			1.46		1.46
May	668.07	724.88	682.82		2,075.27
June	12.00	393.46	306.62		712.08
Total	912.95	4,377.25	6,317.25	1,820.74	13,428.19

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COMMERCIAL STATISTICS.

Traffic statement of western section of Illinois and Mississippi Canal for the fiscal year ending June 30, 1908.

Month.	Commercial steamers and barges.		Government steamers and barges.		Number of passengers.	Commercial freight.	Government freight.	Lockages at three locks.
	Number.	Tons.	Number.	Tons.				
1907.						*Tons.*	*Tons.*	
July	235	752	74	4,310	1,057	26	59	433
August	226	880	129	5,134	875	84	30	540
September	245	1,098	65	2,700	876	102	.....	492
October	199	1,231	122	6,078	1,502	151	28	463
November	86	337	102	5,190	156	84	.....	170
1908.								
March	14	47	98	4,924	65	8	20	86
April	78	149	71	2,779	269	7	18	151
May	157	344	39	1,733	558	9	196	319
June	170	1,242	65	3,402	1,301	45	55	226
Total	1,405	6,580	760	36,245	6,661	521	416	2,910

Total number of steamers, 1,743; total number of barges, 423; total tons of freight, 987.

Z 7.

ILLINOIS AND MISSISSIPPI CANAL—IMPROVEMENT OF ROCK RIVER POOL.

Rock River Pool extends from the vicinity of mouth of Green River (Lock 29) to the head of Rock River Rapids (Lock 35), a distance of about 8½ miles. In this length stretches, aggregating about 5 miles, did not afford a navigable depth of 7 feet, which is the depth afforded by the canal proper, and in a few places not more than 3 feet were found, the surface of the pool being supposed at an elevation of 131 feet, Hennepin datum, the established grade.

In 1902 a survey of Rock River Pool was made, and an estimate based on that survey for a channel 80 feet wide and 7 feet deep is $69,000. A partial project involving an expenditure of $20,000 was rendered and approved in December, 1906, this partial project covering the blasting and dredging of rock to 7 feet where rock existed above the 5-foot curve, and also the dredging of sand and gravel to 7 feet where no rock is met with before that depth is reached. In this manner a considerable portion of the work will be fully completed, but the minimum and ruling depth will be 5 feet.

Work of excavation commenced in April was continued to October 9, 1907, at which date a passable 5-foot channel had been obtained 80 feet wide, except in the lower part of Andersons Chute, where it is only 65 feet wide.

The work was done by drill boat 103, dipper dredges *Ajax* and *Apache*, and hydraulic dredge *Geyser*. The total spoil of the dredges during the season was 56,481 cubic yards sand and 46,665 yards broken rock and gravel.

The amount expended during the fiscal year was $10,113.27.

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Z 8.

OPERATING AND CARE OF GALENA RIVER IMPROVEMENT, ILLINOIS.

During the past fiscal year the lock was open to navigation from July 1 to November 19, 1907, and from April 3 to June 30, 1908, a period of 230 days, during which time it was flooded by backwater from the Mississippi River 57 days and choked by sediment 41 days.

Small repairs were made to lock and dam. About 4,180 cubic yards of mud and 230 cubic yards of gravel were removed from the channel chiefly in and about the lock.

On account of high water the usual June survey of Galena River and Harris Slough was omitted.

APPROPRIATIONS AND ALLOTMENTS.

By act approved—	
September 19, 1890, purchase of improvement	$100,000.00
July 5, 1884, expended during fiscal year ending—	
June 30, 1894	635.68
June 30, 1895	6,000.00
June 30, 1896	3,400.00
June 30, 1897	8,588.20
June 30, 1898	5,890.05
June 30, 1899	3,226.87
June 30, 1900	8,750.94
June 30, 1901	12,077.01
June 30, 1902	9,166.68
June 30, 1903	2,937.27
June 30, 1904	2,916.49
June 30, 1905	3,333.28
June 30, 1906	2,679.91
June 30, 1907	2,805.06
June 30, 1908	4,000.00
Total	176,907.44

Summary of expenditures for operating and care of Galena River improvement for the fiscal year ending June 30, 1908.

Month.	Superintendence, office expenses, supplies, engineering, and contingencies.	Operating.		Repairs.	Dredging.	Total.
		Labor.	Supplies.			
1907.						
July		$190.00				$190.00
August						
September		160.00	$64.14	$187.50		411.64
October		320.00			$111.00	431.00
November		160.00	25.50		387.75	573.25
December	$6.39	160.00			714.96	881.35
1908.						
January		120.00			258.00	378.00
February		120.00	61.20			181.20
March						
April		120.00				120.00
May		320.00	25.48	54.00		399.48
June	260.00	168.00	11.09			434.09
Total	266.39	1,833.00	187.41	241.50	1,471.70	4,003.00

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COMMERCIAL STATISTICS.

Traffic statement of the Galena River improvement for the fiscal year ending June 30, 1908.

Month.	Boats up and down.	Passengers.	Merchandise.	Lockages.
1907.			*Tons.*	
July	319	1,492	166	207
August	207	1,290	177	135
September	338	1,223	488	185
October	426	1,042	892	242
November	126	218	867	78
1908.				
April	121	856	297	150
May	612	2,071	299	149
June	742	3,216	1,238	.....
Total	2,891	11,408	3,874	1,141

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APPENDIX A A.

IMPROVEMENT OF RIVERS AND HARBORS IN THE ST. PAUL, MINNESOTA, DISTRICT.

REPORT OF MAJ. FRANCIS R. SHUNK, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Mississippi River between St. Paul and Minneapolis, Minnesota.
2. Operating and care of Lock and Dam No. 2, Mississippi River, between St. Paul and Minneapolis, Minnesota.
3. Reservoirs at headwaters of Mississippi River, and Mississippi River between Brainerd and Grand Rapids, Minnesota.
4. Operating and care of reservoirs at headwaters of Mississippi River.
5. St. Croix River, Wisconsin and Minnesota.
6. Minnesota River, Minnesota.
7. Red River of the North, Minnesota and North Dakota.
8. Warroad Harbor and Warroad River, Minnesota.
9. Survey of Otter Tail Lake and Otter Tail River and Red Lake and Red Lake River, Minnesota, and Big Stone Lake and Lake Traverse, Minnesota and South Dakota.
10. Gauging Mississippi River at or near St. Paul, Minnesota.

UNITED STATES ENGINEER OFFICE,
St. Paul, Minn., July 18, 1908.

SIR: I have the honor to submit herewith * * * annual report for the St. Paul, Minn., district for the fiscal year ending June 30, 1908.

Very respectfully,

FRANCIS R. SHUNK,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

A A 1.

IMPROVEMENT OF MISSISSIPPI RIVER BETWEEN ST. PAUL AND MINNEAPOLIS, MINNESOTA.

The approved project will be found in the Report of the Chief of Engineers for 1908, Part 1, page 529.

Lock and Dam No. 1.—From July 1 to the middle of December, 1907, steady progress was made in constructing the land wall and floor of the lock. When it became too cold for concrete work the

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cofferdam was allowed to fill and the working force reduced. During the winter work was carried on in filling back of the land wall, quarrying rock and breaking same to crusher size, constructing a permanent pump and boiler house, enlarging crushed-rock storage bins, building concrete forms for river wall of lock, and laying and ballasting tracks for the cableway. The cableway and other plant remaining at Lock and Dam No. 2 were hauled to No. 1 and there installed. Drawings for upper gate of lock were completed. On April 8, 1908, the cofferdam was pumped out and the construction of land wall and floor of lock was resumed. On May 30, 1908, high water in the river flooded the cofferdam, and from that time until the end of the year work was confined to filling back of the land wall and the construction of concrete forms.

The following is a detailed statement of work accomplished during the year: Three hundred and ninety linear feet of the land wall of lock and 370 linear feet of lock floor and sills completed, making a total of 10,500 cubic yards of concrete placed; 6,653 cubic yards of earth placed as back filling for the land wall of lock; 5,130 cubic yards excavation for lock walls and floor; 3,861 linear feet of 12-inch tile drain laid under lock floor; 1,006 round piles driven for foundation of river wall and sills of lock; 44 wood and 98 steel sheet piles driven, making 142 linear feet of permanent cut-off wall for the lock.

Lock and Dam No. 2.—A keeper's dwelling was constructed, all the work being done by hired labor except the plumbing, heating, and electric wiring, which were done by contract. Since July 1, 1907, this lock and dam have been cared for by allotment from the indefinite appropriation for "Operating and Care of Canals and Other Works of Navigation."

Statement of expenditures during the year.

LOCK AND DAM NO. 2.

Cleaning up	$125.81	
Lock keeper's dwelling	5,408.29	
Repairs to beartrap sluice gates	29.28	
Repairs to lock floor	346.88	
Rent of land for cableway	116.62	
		$6,026.88

LOCK AND DAM NO. 1.

Backfilling land wall	1,722.04	
Concrete	62,922.80	
Cut-off wall	9,385.59	
Dam	60.00	
Dam cofferdam	2.03	
Engineering and superintendence	3,765.24	
Excavation	5,246.65	
Foundation piles	1,944.38	
Lumber transferred to Sandy Lake dam	242.25	
Needle dams	82.00	
Plant	16,852.32	
Pumping lock cofferdam	11,375.09	
Removing plant from Lock and Dam No. 2	1,174.62	
Tile drains under lock floor	1,643.55	
		116,418.56
St. Paul office		6,278.53
Office division engineer		100.00
Total		128,823.97

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Money statement.

July 1, 1907, balance unexpended	$293,897.38
Amount derived from sales	2,349.59
	296,246.97
June 30, 1908, amount expended during fiscal year for works of improvement	128,823.97
July 1, 1908, balance unexpended	167,423.00
July 1, 1908, outstanding liabilities	14,845.50
July 1, 1908, balance available	152,577.50
Amount (estimated) required for completion of existing project	239,543.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	239,543.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 18, 1894	$51,000.00	March 3, 1901	$157,000.00
July 13, 1892 (allotted by act of August 18, 1894)	49,877.67	June 28, 1902	250,000.00
		March 3, 1903	223,579.33
June 3, 1896	100,000.00	June 30, 1906	30,000.00
March 3, 1899	150,000.00	March 4, 1907	30,000.00
June 6, 1900	185,000.00	Total	1,226,457.00

Receipts from sales $2,362.78

COMMERCIAL STATISTICS.

The principal commerce over this part of the river was in drifting about 72,000,000 feet B. M. of loose logs (about 300,000 tons) over the upper and middle sections and rafting the same with steamboats on the lower section. The estimated value of these logs was $900,000.

The excursion business on the lower and middle sections amounted to about $15,000. The river is also much used by steam and naphtha pleasure boats.

A A 2.

OPERATING AND CARE OF LOCK NO. 2, MISSISSIPPI RIVER BETWEEN ST. PAUL AND MINNEAPOLIS, MINNESOTA.

The approved project will be found in the Report of the Chief of Engineers for 1908, Part 1, page 531.

The expenditures during the year were $5,578.45.

The lock was open for navigation until November 25, 1907, when the upper needle dams were put in, the upper gate lowered, and the lower gates opened. On April 10, 1908, the lock was again put in commission.

About 400 cubic yards of rock were dumped in the river below the east sluice gate of the dam to prevent possible scour. During the

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winter the east bear-trap sluice gate was opened up and found to in a condition similar to that of the west gate before its repair in 1 (see pages 1578–1579 and cuts opposite page 1580 of the Report the Chief of Engineers for 1907). Twenty-four of the long cha were broken and fifteen of the short ones. New chains were put and the rods and turn-buckles taken out. The apron of the d which had been injured by floating logs, was repaired by filling damaged places with gravel and small stones and paving the top w large rocks. Fifty cubic yards of material were used in the repa

The following is a brief statement of the liabilities incurred dur the year:

Operation and minor repairs	$2,74
Repairs to east bear-trap sluice gate	2,040.
Administration, superintendence, etc	94
	5,73

Money statement.

Total liabilities incurred during fiscal year	$5,73
Amount available June 30, 1908	94
	6,68

ALLOTMENT.

June 21, 1907	$6,

COMMERCIAL STATISTICS.

For commercial statistics reference should be made to the report on the I provement of the Mississippi River between St. Paul and Minneapolis, Minn.

A A 3.

CONSTRUCTION OF RESERVOIRS AT HEADWATERS OF MISSISSIP RIVER AND IMPROVEMENT OF MISSISSIPPI RIVER BETWE BRAINERD AND GRAND RAPIDS, MINNESOTA.

The approved project will be found in the Report of the Chief o Engineers for 1908, Part 1, page 532.

OPERATIONS DURING THE YEAR.

Reconstruction of Pine River reservoir.—The dam was complete at the beginning of the year and work was confined to clearing up th site, removal of cofferdam, and loading and shipping the plant b wagon to the mouth of Pine River and thence by steamboat to Sandy Lake for use in the reconstruction of Sandy Lake dam.

Dikes around Pine River reservoir.—Six dikes were completed an 3 partly built. In this work 11,810 square yards of ground wer grubbed and stripped of surface soil; 49,043 cubic yards of sand an 8,691 cubic yards of surface soil, a total of 57,734 cubic yards, wer placed. Of the 17 dikes originally projected 11 have been complete (of which 4, built a number of years ago, need repair), 3 have be partly built, and 1 will not be needed; 2 remain to be built.

Reconstruction of Sandy Lake dam.—Proposals were issued fo the construction of the first half of the dam but no bids were received. The project was then modified and construction by hired labor begu

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n September, 1907. The quarters and storage buildings were repaired. One-half of the old dam was removed, 12,000 cubic feet of timbers, 1,280 cubic yards of rock fill, and 450 cubic yards of earth being taken out. The floor of the dam was cleared and the foundation strengthened by driving fourteen round piles. A new cement shed was built, and rock-crushing and concrete-mixing plants were installed; 940 cubic yards of rock were crushed and 380 cubic yards of sand hauled. Necessary repairs were made to the telephone line and the road to McGregor. At the end of May the cofferdam was flooded by high water in the river and thereafter no actual work of construction was possible up to the close of the year.

Gull Lake reservoir.—Negotiations have been carried on during the year with a view to obtaining cession of flowage rights around Gull Lake. Persons interested in the proposed improvement have undertaken to secure such rights and cede them to the United States. The total area involved is about 800 acres. At the end of the year contingent arrangements had been made for about 500 acres with the proviso that rights over the whole area should be acquired. In case the owners of the remaining 300 acres decline to make the desired cession, it is probable that condemnation proceedings will be instituted under the provisions of the act of June 29, 1906.

Purchase of lands and easements.—Flowage right was obtained from private owners on 8 tracts, containing 143.78 acres at an average cost of $2.33 per acre. By condemnation the flowage right was obtained on 1,597.57 acres, at an average cost of $3.81 per acre, and fee title on 30.89 acres, at $5 per acre. Condemnation proceedings are pending for the rest of the lands and easements required. The awards have been made by the commissioners and accepted by the United States but decrees have not yet been entered.

The cost of the work accomplished during the year is shown in the following itemized statement:

Reconstruction of Pine River dam:		
Embankments	$129.16	
Gauging station	358.52	
Inspection	196.30	
Plant	345.55	
Repairs to buildings	271.17	
Riprapping	216.88	
		$1,517.58
Construction of dikes around Pine River reservoir		17,008.54
Reconstruction of Sandy Lake dam:		
Booms and piers	75.10	
Buildings	3,589.18	
Cofferdam	2,527.09	
Concrete (materials, crushing, etc.)	8,200.13	
Foundations	2,855.23	
Inspection	121.77	
Plant	1,784.58	
Removal of old dam	6,560.03	
Repairs to roads	84.00	
Repairs to telephone line	92.33	
Transfer of plant	4,500.83	
		30,390.27
Construction of Gull Lake reservoir, gauging		79.72
Purchase of lands or easements:		
Below Pokegama	2,827.99	
Above Pokegama	5,166.66	
		7,994.65
Administration and St. Paul office expenses		4,332.15
Total		61,822.91

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Money statement.

July 1, 1907, balance unexpended	$283,097.6
Amount derived from sales and refundment	195.6
	283,292.6
June 30, 1908, amount expended during fiscal year for works of improvement	61,322.8
July 1, 1908, balance unexpended	221,969.7
July 1, 1908, outstanding liabilities	8,630.8
July 1, 1908, balance available	213,339.6

APPROPRIATIONS.

June 14, 1880	$75,000	August 18, 1894	$51,0
March 3, 1881	150,000	June 3, 1896	80,0
August 2, 1882	300,000	March 3, 1899	210,0
July 5, 1884	60,000	June 13, 1902	250,0
August 5, 1886	37,500	March 3, 1905	160,0
August 11, 1888	12,000	March 2, 1907	145,0
September 19, 1890	80,000		
July 13, 1892	60,000	Total	1,670,5

Receipts from sales	$189.6
Refundments	44.0

COMMERCIAL STATISTICS.

Mississippi River between Brainerd and Grand Rapids.—The river business for the season of 1907 was carried by the steamer *Irene*, 30 tons, and steam barge *Atlas*, 400 tons, both of Aitkin, Minn., and several smaller boats ranging from 5 to 15 tons, owned at Brainerd and other places.

During the season these boats carried about 6,000 tons of miscellaneous freight of an estimated value of $450,000, and about 4,000 passengers.

About 300,000,000 feet B. M. of loose logs and rafts of railway ties, cedar poles, and pulp wood were floated down the river. The weight of these was about 1,055,000 tons and their value about $3,600,000.

A A 4.

OPERATING AND CARE OF RESERVOIRS AT HEADWATERS OF MISSISSIPPI RIVER.

The approved project will be found in the Report of the Chief of Engineers for 1908, Part 1, page 534.

Winnibigoshish, Leech Lake, Pokegama, and Pine River reservoirs were in operation during the entire year. Sandy Lake was out of commission on account of the reconstruction of the dam. Repairs were made as follows:

Winnibigoshish reservoir.—The dikes near Bena were strengthened by the addition of 722 cubic yards of earth. The road from the dam to Bena and Leech Lake dam was repaired by placing 1,284 cubic yards of earth on the low places and renewing culverts. The telephone line to Bena and Leech Lake dam was repaired, 244 new poles and about 5 miles of new copper wire being put in. Minor repairs were made to the sluice gates, booms, and buildings at the dam.

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Leech Lake reservoir.—The earthen embankment in prolongation of the dam was strengthened by the addition of about 8,000 cubic yards of earth.

Pokegama reservoir.—Repairs were made to the revetment at the north end of the dam by building a retaining wall containing about 20 cubic yards of concrete. Necessary repairs of a minor nature were made to the sluice gates, booms, and buildings at the dam.

Pine River reservoir.—The ironwork of the sluice gates of the dam was painted, repairs made to the dam tender's house, and fences around quarters were renewed.

The following is a brief statement of the liabilities incurred during the year:

Operation and minor repairs to dams and quarters	$8,337.70
Repairs to dikes, Winnibigoshish reservoir	515.13
Repairs to embankment, Leech Lake dam	3,157.64
Repairs to abutment, Pokegama dam	199.32
Repairs to roads and telephone lines	1,063.14
Hydrological expenses	218.10
Administration, traveling expenses, etc	4,878.84
Total	18,369.87

The following table shows the discharge and difference in storage for the year:

Reservoir.	Gauge in lake.			Average discharge per second.	Total storage June 30, 1908.	Increase (+) or decrease (−) in storage since June 30, 1907.
	Standard high water flowage line.	June 30, 1907.	June 30, 1908.			
	Feet.	*Feet.*	*Feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*
Winnibigoshish[a]	14.20	12.50	12.41	629	86,204,338,000	− 424,062,000
Leech Lake[a]	5.74	8.80	4.56	328	25,618,012,000	+4,653,992,000
Pokegama	12.00	11.10	11.49	1,311	4,755,100,000	+ 386,100,000
Pine River	18.50	12.30	13.38	309	4,510,982,000	+ 638,062,000
Sandy Lake	11.00	5.30	8.05	212	1,910,270,000	+ 950,490,000
Total					72,998,702,000	+6,204,582,000

[a] The water from these two reservoirs passes through the Pokegama reservoir. Total average discharge from Pokegama, Pine, and Sandy, 1,832 cubic feet per second.

Total liabilities incurred in each fiscal year.

During fiscal year ending June 30—	
1895	$6,416.19
1896	30,800.15
1897	35,180.41
1898	19,487.80
1899	14,100.02
1900	19,350.00
1901	18,498.12
1902	14,500.00
1903	12,302.18
1904	$11,280.00
1905	12,940.00
1906	24,789.03
1907	16,084.97
1908	18,369.87
Amount available June 30, 1908	664.23
Total	254,762.97

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ALLOTMENTS.

January 25, 1895	$17,590.00	July 16, 1902	$13,300.00
June 15, 1895	18,852.91	July 23, 1903	12,182.18
June 20, 1896	5,000.00	July 12, 1904	5,540.00
July 24, 1896	23,471.98	July 13, 1905	13,400.00
For repairs to Pine River reservoir	7,481.86	October 19, 1905	7,000.00
		May 29, 1906	2,500.00
August 4, 1897	23,870.00	June 28, 1906	15,914.00
August 4, 1898	16,347.80	June 21, 1907	19,034.00
August 15, 1899	12,720.02		
July 16, 1900	20,610.00	Total	254,762.87
September 28, 1900	7,000.00	Refundments	.10
August 12, 1901	12,948.12		

COMMERCIAL STATISTICS.

For commercial statistics, reference must be made to the reports upon the improvement of the Mississippi River between Brainerd and Grand Rapids, Minn., and between Minneapolis and St. Paul, Minn.

A A 5.

IMPROVEMENT OF ST. CROIX RIVER, WISCONSIN AND MINNESOTA.

The approved project will be found in the Report of the Chief of Engineers for 1908, Part 1, page 535.

Work was begun just before the close of the last fiscal year and consisted in dredging and repair of wing dams in the vicinity of Osceola, Wis. About 60 linear feet of channel were dredged to a width of 40 feet and low-water depth of 4 feet, about 355 cubic yards of material being removed. Five wing dams were repaired, a total of 964 linear feet being worked over. The material used in these repairs aggregated 359 cords of brush fascines and 137 cords of riprap stone.

Work was suspended October 29, 1907, and the fleet moved to South Stillwater, Minn., where it was laid up for the winter. Repairs were made to the dredge *St. Croix* and barges in the spring of 1908, but no work of improvement could be done on account of exhaustion of funds.

Statement of expenditures during the year.

Dredging	$34.40
Repairing brush and stone dams	1,372.23
Repairing dredge and barges	1,220.59
Subsistence	400.67
Outfit of dredge	2.91
Gaugings	32.50
Inspection	44.75
Care of boats and property	303.00
St. Paul office	22.87
Total	3,433.92

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Money statement.

July 1, 1907, balance unexpended	$3,831.66
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	3,433.92
July 1, 1908, balance unexpended	397.74
July 1, 1908, outstanding liabilities	46.50
July 1, 1908, balance available	351.24
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	3,600.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 18, 1878	$10,000	August 18, 1894	$4,000
March 3, 1879	8,000	June 3, 1896	15,000
June 14, 1880	10,000	March 3, 1899	9,000
March 3, 1881	8,000	June 13, 1902	2,000
August 2, 1882	30,000	April 28, 1904 (allotment)	865
July 5, 1884	9,000	March 3, 1905	4,000
August 5, 1886	7,500	March 2, 1907	4,000
August 11, 1888	10,000		
September 19, 1890	8,000	Total	147,365
July 13, 1892	8,000		

COMMERCIAL STATISTICS, SEASON OF 1907.

Rafted lumber, etc., towed out of St. Croix River:		
Lumber	feet B. M.	60,000,000
Shingles		6,000,000
Laths		15,000,000
Loose logs run on river above Stillwater	feet B. M.	78,000,000
	tons	273,000
Number of steamboats engaged in rafting business out of Stillwater		9

One steamboat made daily trips between Osceola, Wis., and Taylors Falls, Minn., carrying passengers and a little freight, but no information could be obtained of the amount of business done. A gasoline launch made daily trips between Stillwater, Minn., and Taylors Falls when the state of the river would permit. About 1,800 passengers were carried.

A A 6.

IMPROVEMENT OF MINNESOTA RIVER, MINNESOTA.

The approved project will be found in the Report of the Chief of Engineers for 1908, Part 1, page 536.

No work was done during the year, the stage of the river being too high to permit it, except during the time when the only available plant was engaged on the St. Croix River improvement.

The dam at the mouth being very much damaged, so as to necessitate either renewal or removal, recommendation was made that it

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be removed and the accumulated shoals dredged. This recommendation was approved by the Secretary of War May 26, 1908, and it is proposed to do the work as soon as the stage of water in the river will permit.

Money statement.

July 1, 1907, balance unexpended	$2,145.77
June 13, 1902, appropriation for removing dam near mouth	2,500.00
	4,645.77
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	250.81
July 1, 1908, balance unexpended	4,394.96
July 1, 1908, balance available	4,394.96
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	2,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

March 3, 1867	$37,500	August 11, 1888	$10,000
July 11, 1870	10,000	June 3, 1896	4,000
March 3, 1871	10,000	March 3, 1899	1,000
June 10, 1872	10,000	June 13, 1902	2,500
March 3, 1873	10,000	March 3, 1905	3,000
June 23, 1874	10,000	March 2, 1907	2,000
March 3, 1875	10,000		
August 14, 1876	10,000	Total	140,000
June 18, 1878	10,000		

COMMERCIAL STATISTICS.

Navigation on the Minnesota River during recent years has been confined to irregular trips of excursion steamers from St. Paul, Hastings, Stillwater, etc., to Shakopee. The Minnesota River has also become a popular resort for private steam and naphtha launches from St. Paul and other places.

Statistics of number of trips made and passengers carried by the various boats engaged in this navigation during the season of 1907 have not been furnished.

A A 7.

IMPROVEMENT OF RED RIVER OF THE NORTH, MINNESOTA AND NORTH DAKOTA.

The approved project will be found in the Report of the Chief of Engineers for 1908, Part 1, page 537.

Work of dredging and snagging were in progress at the beginning of the fiscal year and continued until October 28, 1907, when operations had to be suspended on account of cold weather. Dredging was confined to the 10 miles of river just north of Grand Forks, N. Dak. Cuts aggregating in length 7,915 feet were made to a width

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of 60 feet and a low-water depth of 3 feet. Total amount of material removed, 35,950 cubic yards. Snagging was done by the steamboat *Ogama* over 60 miles of river; 292 overhanging trees from 4 inches to 24 inches diameter, 69 snags from 6 inches to 27 inches diameter, 43 stumps, 8 sunken logs, and 20 bowlders were removed.

Work of repairs to the fleet was begun May 7, 1908, and continued until the end of the fiscal year.

Statement of expenditures during the year.

Repairs to boats and machinery	$996.46
Dredging and snagging	4,355.43
Subsistence	1,058.87
Fuel	744.63
Outfit	148.03
Care of boats and property	437.30
Inspection and St. Paul office expenses	825.04
Total	8,565.76

Money statement.

July 1, 1907, balance unexpended	$13,580.56
Amount derived from sales	10.00
	13,590.56
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	8,565.76
July 1, 1908, balance unexpended	5,024.80
July 1, 1908, outstanding liabilities	912.17
July 1, 1908, balance available	4,112.63
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	7,500.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 14, 1876	$10,000	July 13, 1892	$25,000
June 18, 1878	30,000	August 18, 1894	15,000
March 3, 1879	25,000	June 3, 1896	20,000
June 14, 1880	20,000	March 3, 1899	25,000
March 3, 1881	18,000	June 13, 1902	10,000
August 2, 1882	10,000	April 28, 1904 (allotment)	1,623
July 5, 1884	10,000	March 3, 1905	9,000
August 5, 1886	50,000	March 2, 1907	15,000
August 11, 1888	20,000		
September 19, 1890	25,000	Total	338,623

Receipts from sales $159.50

COMMERCIAL STATISTICS.

Red River of the North.—Two steamboats from 25 to 100 tons burden and about 30 inches draft, with a fleet of 12 barges, were operated on the river from Grand Forks, N. Dak. Total freight carried, 8,158 tons.

Red Lake River.—Four steamboats and one gasoline launch carried general merchandise and passengers between Thief River Falls and points on Red Lake,

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and assisted in hauling rafts of lumber and logs. No figures could be obtained of the amount of business done by these boats in 1907. About 62,000,000 feet B. M. of logs were floated down the river, their weight being about 217,000 tons and their value about $700,000.

A A 8.

IMPROVEMENT OF WARROAD HARBOR AND WARROAD RIVER, MINNESOTA.

The approved project will be found in the Annual Report of the Chief of Engineers for 1908, Part 1, page 539.

Dredging under the project was in progress at the beginning of the fiscal year and continued until September 26, 1907. At this time, by authority of the Secretary of War, the dredge and outfit were turned over to representatives of the Canadian government for work at the mouth of Rainey River, Minnesota and Ontario. This work was finished on October 22, 1907, and the dredge returned to Warroad. It then appeared desirable to do a little more work at Warroad Harbor and dredging was resumed and continued until October 27, when the fleet was laid up for the winter.

March 17, 1908, necessary repairs to the fleet were begun, and completed April 21, when dredging was resumed and continued until the close of the fiscal year. During the year considerable redredging of previously dredged channels was done and a portion of the channel 7,000 feet long was widened from 100 to 200 feet. The total excavation was 105,405 cubic yards. The available funds will be exhausted in about three weeks, when the project will be completed.

Statement of expenditures during the year.

Dredging	$5,671.21
Subsistence	1,056.59
Fuel	2,213.87
Outfit of dredge	492.13
Repairs	886.84
Surveys and soundings	72.97
Care of boats and property	247.50
Inspection and St. Paul office expenses	392.23
Total	11,033.34

Money statement.

July 1, 1907, balance unexpended		$12,282.41
Amount derived from refundments		590.57
		12,872.98
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$7,355.56	
For maintenance of improvement	3,677.78	
		11,033.34
July 1, 1908, balance unexpended		1,839.64
July 1, 1908, outstanding liabilities		847.81
July 1, 1908, balance available		991.83

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APPROPRIATIONS.

March 3, 1899	$3,000.00
June 13, 1902	45,000.00
March 3, 1905	35,000.00
Total	83,000.00
Refundment	590.57

COMMERCIAL STATISTICS.

The town of Warroad, now 8 years old, has a population of about 800, and the adjacent country is gradually filling up with settlers.

Until recently Warroad Harbor has had no regular lake traffic, the condition of the entrance to the harbor not having been such as to permit it.

On Lake of the Woods there are at present 25 or more registered Canadian boats, ranging from 30 to 486 tons burden, any of which can now visit Warroad Harbor.

The United States boats which visit Warroad Harbor are the propellers *Na-ma-puk* and *Knute Nelson*, the former about 36 feet long and the latter about 80 feet, 5 sailing vessels, and 2 gasoline boats. A total of about 2,000 tons of freight and 2,000 passengers were carried during the season of 1907.

A A 9.

SURVEY OF OTTER TAIL LAKE AND OTTER TAIL RIVER, RED LAKE AND RED LAKE RIVER, MINNESOTA, AND BIG STONE LAKE AND LAKE TRAVERSE, MINNESOTA AND SOUTH DAKOTA.

The approved project will be found in the Annual Report of the Chief of Engineers for 1908, Part 1, page 540.

No work was done during the year.

Money statement.

July 1, 1907, balance unexpended	$8,210.90
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	4.18
July 1, 1908, balance unexpended	8,206.72
July 1, 1908, balance available	8,206.72

APPROPRIATIONS AND ALLOTMENTS.

By act—	
Passed June 3, 1896 (allotment for Big Stone Lake, etc.)	$2,500
Approved March 3, 1899:	
Appropriation for Big Stone Lake, etc	5,000
Appropriation for Red Lake and Red Lake River	5,000
Appropriation for Ottertail Lake, etc	3,000
Approved June 13, 1902 (allotment for continuing surveys)	10,000
Total	25,500

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A A 10.

GAUGING MISSISSIPPI RIVER AT OR NEAR ST. PAUL, MINNESOTA.

The approved project will be found in the Report of the Chief of Engineers for 1908, page 541.

During the year the gauges between Lock No. 2 and the mouth of the Minnesota River were read and meter measurements of the Mississippi River taken between Lock No. 2 and Lock No. 1.

Money statement.

July 1, 1907, balance unexpended	$500.00
Amount returned to Treasury	249.08
	250.92
Allotment for fiscal year 1908	500.00
	750.92
June 30, 1908, amount expended during fiscal year	641.84
July 1, 1908, balance unexpended	109.08
July 1, 1908, outstanding liabilities	109.08

ALLOTMENTS.

For fiscal year ending June 30—		For fiscal year ending June 30—	
1889	$900.00	1905	$500.00
1890	600.00	1906	500.00
1891	900.00	1907	500.00
1892	900.00	1908	500.00
1893	500.00		
1894	500.00	Total allotted	9,800.00
1895	500.00	Returned to Treasury	2,538.20
1896	500.00		
1897	500.00		7,261.80
1898	500.00	Available balance June 30, 1908	109.08
1900	500.00		
1903	500.00	Total expended	7,152.72
1904	500.00		

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APPENDIX B B.

IMPROVEMENT OF RIVERS AND HARBORS IN THE KANSAS CITY, MISSOURI, DISTRICT.

REPORT OF CAPT. EDWARD H. SCHULZ, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Missouri River.
2. Osage River, Missouri.
3. Gasconade River, Missouri.

UNITED STATES ENGINEER OFFICE,
Kansas City, Mo., July 14, 1908.

SIR: I have the honor to submit herewith my annual report upon the improvement of the Missouri, Osage, and Gasconade rivers for the fiscal year ending June 30, 1908, * * *.

Very respectfully,

EDWARD H. SCHULZ,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

B B 1.

IMPROVEMENT OF MISSOURI RIVER.

This work was in local charge of Assistant Engineer W. R. De Witt, extracts from whose reports are embodied in the following.

The improvement work on the Missouri River during the fiscal year has consisted in the maintenance of existing works, construction of new works, and in snagging. Balances available at the beginning and close of the fiscal year from the various appropriations were:

For improving Missouri River from mouth to Sioux City, Iowa.

Act of March 3, 1905, amount appropriated (last appropriation)		$150,000.00
Balance unexpended July 1, 1907, from various appropriations		36,392.51
Expenditures during the year:		
Repairing dikes at St. Joseph, Mo., below Grand Island bridge, by reenforcing bottom with brush and rock fascines, and rescreening	$4,606.08	
Freight paid on materials received previous to July 1, 1907	6,591.05	

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Expenditures during the year—Continued.		
On June 22, 1908, due to excessive scour, about 250 feet of longitudinal dike went out just above cross dike No. 2 at St. Joseph; the remaining portion was immediately secured by cable and the end of dike held with 2,000 sand bags at lower end of breach. Dike will be replaced as river conditions permit	$526.52	
A harbor line survey at Omaha was made in fall of 1907 and spring of 1908. A drawing showing the shore line survey is herewith, marked Plate 1. A harbor line hearing will be held during the coming summer and harbor lines established	600.70	
Miscellaneous items, office expenses, plant, etc	6,801.62	
Total	19,125.97	
Outstanding liabilities	1,170.02	
		$17,955.
Balance available July 1, 1908		18,436.

Improving Missouri River from Stubbs Ferry, Mont., to Sioux City, Iowa.

Act of March 3, 1905, appropriated		$75,000.
Balance unexpended July 1, 1907	$5,730.32	
Credit by transfer of material, etc., to other works	5,097.12	
		10,827.
Expenditures during the year:		
These were mainly care of plant, freight charges, inspection, office expenses, etc		5,022.
Balance unexpended July 1, 1908		5,804.

Improving Missouri River from mouth to Fort Benton, Mont.

Act of March 2, 1907, appropriated		$400,000.
Balance unexpended July 1, 1907	$378,662.27	
Received from sale of maps and overpayments	64.12	
		378,726.
Expenditures during the year		146,867.
Balance unexpended July 1, 1908		231,859.

This work is being carried on under an approved project, as follows:

From mouth to Kansas City, Mo.

For repairing and outfitting the snag boat *C. R. Suter*	$10,00
For operating the snag boat *C. R. Suter* (now the *Missouri*) two seasons	85,00
For care of plant, office and traveling expenses, etc., two seasons	25,00
For extraordinary contingencies and such work of revetment or bank protection as is directly and necessarily required for purposes of navigation	[a]30,00
	150,00

[a] Six thousand dollars of this amount allotted for work at Miami, Mo. $19,000 of this amount allotted for work at Little Blue Reach; $5,000 of this amount allotted for work at St. Aubert Bend.

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From Kansas City, Mo., to Sioux City, Iowa.

For repairing and outfitting the snag boat *James B. McPherson*	$10,000
For operating the snag boat *James B. McPherson* (two seasons)	59,000
For care of plant, office and traveling expenses, etc. (two seasons)	30,000
For survey work at St. Joseph, Mo	1,000
For extraordinary contingencies and such work of revetment or bank protection as is directly and necessarily required for purposes of navigation	[a] 50,000
	150,000

There has also been allotted to this stretch of river, for continuation of work at Elwood, Kans., the sum of $20,000, as follows:

Act of March 3, 1905, allotted by the Secretary of War	$10,000
Act of March 2, 1907, allotted by the Secretary of War	10,000
	20,000

From Sioux City, Iowa, to Fort Benton, Mont.

For launching, repairing, and outfitting the snag boat *Mandan*	$3,000
For operating the snag boat *Mandan* between Sioux City, Iowa, and the forty-sixth parallel (two seasons)	30,000
For operating the snag boat *Mandan* between the forty-sixth parallel and Fort Benton, Mont. (two seasons)	7,000
For improving the harbor at Bismarck, N. Dak., etc., on the east side of the river, below the Northern Pacific Railroad bridge, by construction of pile dikes or such other works as may be suitable	30,000
For care of plant, office and traveling expenses, etc., between Sioux City, Iowa, and the forty-sixth parallel	17,000
For care of plant, etc., above forty-sixth parallel and sundry miscellaneous	13,000
	100,000

Under the above project the work comprised snagging, care of and repairs to plant, dike and revetment work, and examinations, as follows:

FROM MOUTH TO KANSAS CITY, MO.

Snagging.—The snag boat *Missouri* underwent extensive repairs to boilers and electric-light system, and proceeded upstream August 27, 1907, reaching Kansas City on October 3, 1907. On October 7 she started downstream with the Inland Waterways Commission aboard, arriving at St. Louis October 13, 1907. She left St. Louis again October 24, proceeding upstream until November 4, when she was ordered to Keokuk, Iowa, to go into dry dock, remaining there until March 25, 1908. Her hull was found in good condition after about twenty years' use, and the repairs consisted in overhauling machinery, painting hull, replacing timbers in the butting beam, and rebuilding paddle wheels.

On March 30, 1908, she left St. Louis on her snagging trip upstream, arriving at Kansas City May 20, 1908, and again reaching St. Louis June 5, where she is now tied up pending fall of high water.

During the year the boat removed 716 snags, 22 wrack heaps, and 2 sunken launches, and removed from banks 1,232 trees.

[a] Thirty thousand dollars allotted for Elwood Bend; $20,000 allotted for repair of works in Belmont and Bonton bends

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Expenditures during year.

Repairing and outfitting, including current repairs and supplies for two seasons	$23,505.9[illegible]
Operations	17,794.0[illegible]
Total	41,300.0[illegible]

Plant—Construction.—A small force was occupied at the boat and supply yard at Gasconade, Mo., throughout the year in taking care of and repairing plant and handling materials, tools, and supplies for construction parties.

The following pieces were repaired, the ones requiring it being pulled out of the river onto the ways and relaunched:

2 steam tenders, *Arethusa* and *Atalanta*.
2 steam pile drivers.
1 mattress boat.
8 barges.
1 office boat.
2 barges (for Osage River).

Dike work at Miami, Mo.—In accordance with project approved June 19, 1908, 700 linear feet of 3-row pile dike was built in the vicinity of the bankhead below Miami, 200 feet above and 500 feet below, to break up eddy action that was threatening the structure. This work was commenced August 9, 1907, and completed October 5, 1907, at a cost of $6,276.29.

A drawing showing location and extent is herewith, marked Plate II.[a]

Little Blue Reach.—In accordance with project approved April 25, 1908, it is proposed to build 900 linear feet of 3-row pile longitudinal dike, strengthened by 4 short buttress dikes, at head of bight just above the bankhead opposite Atherton, Mo., for the purpose of causing the bight to fill and protect the bankhead against destruction, at an estimated cost of $19,000.

St. Aubert Bend.—In accordance with project approved April 10, 1908, it is proposed to rebuild 1,000 linear feet and repair balance of the revetment in this bend at an estimated cost of $10,000.

Contracts have been let for furnishing the necessary brush and stone, and other materials required have been purchased. The work will be done after the subsidence of the present flood.

EXAMINATIONS AND REPORTS.

A report, including project and estimate for improving the Missouri River from Sioux City, Iowa, to Kansas City, and Kansas City to mouth was submitted to the department on April 30, 1908, in accordance with the requirements of the act of March 2, 1907, as follows:

For a 6-foot depth, Kansas City to mouth	$3,500,000
For a 12-foot depth, Kansas City to mouth	20,000,000
Snagging, annually	60,000
Maintenance, annually, 6-foot project	87,500
Maintenance, annually, 12-foot project	500,000

[a] Not printed.

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Inspections for the information of this office were made at St. Charles (dumping), Chamois (revetment), and Jefferson City, Mo. (overhead telephone wires).

A tentative project for a length of 21 miles of Missouri River in vicinity of Pinckney Bend was transmitted to Hon. F. S. Newlands, through the department, November 18, 1907.

Inspections and reports were made to the department as follows:

St. Aubert Bend, March 23, 1908.
Overton, Mo., June 12, 1908.
David Neale's system of bank protection at Myrick, Marion, Boonville, and Boles, Mo., March 30, 1908.
Nigger Bend, July 29, 1907.
Atherton, Mo., February 24, 1908.
Kansas City, Mo., sand dredges, April 21, 1908.
River inspections by the officer in charge were made: October 7 to 12, 1907, Kansas City, Mo., to St. Charles, Mo.; April 1 to 3, 1908, St. Charles, Mo., to mouth of river.
In compliance with instructions, and on complaint of Capt. Wm. M. Young, of Kansas City, Mo., on account of slow opening of draw span of the Jefferson City bridge, report was submitted to Chief of Engineers October 15, 1907. A public hearing was held at Jefferson City January 15, 1908, and report submitted to the Chief of Engineers January 23, 1908.
Notice was served on the Jefferson City Bridge and Transit Company February 15, 1908, to install proper electric or other power motors for operating the draw promptly, to be accomplished six months from date of notice.

FROM KANSAS CITY, MO., TO SIOUX CITY, IOWA.

Snagging.—The snag boat *James B. McPherson* arrived upstream (Sioux City, Iowa) on July 19, 1907; proceeding downstream again August 6, 1907, as far as St. Joseph; thence upstream to Sioux City, arriving September 10, 1907. She started downstream September 26, arriving at Atchison October 2, 1907. On account of channel at Atchison having left the draw of low bridge she could not proceed farther downstream. She then returned upstream, arriving at Sioux City November 5, and soon after went into winter quarters in Big Sioux River.

A slight delay occurred in April, 1908, at the combination bridge (draw) at Sioux City, Iowa, due to shifting channel, but the snag boat finally cut her way through on April 17, arriving at Kansas City May 7. Left Kansas City May 8, arrived Sioux City June 5. Left Sioux City June 22, arrived Leavenworth June 30. At this point draw of bridge could not be opened on account of high water.

The repairs to the boat were of a minor nature. All machinery was thoroughly overhauled and put in working order.

The work of the boat consisted of the following:

Removing 614 snags and 3 wrack heaps from channel.
Removing 1 boiler from sunken steamer *Susan*, in Bertrand Bend.
Removing 447 trees from caving banks.

The following expenditures were made during the year:

For repairing and outfitting	$2,856.84
For operations	14,483.48
Total	17,340.32

Plant construction.—The only plant in use on this stretch of the river was at Elwood, Kans., and consisted of 1 towboat, 1 pile driver, 1 mattress boat, and 8 barges.

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This plant was all repaired at the boat and supply yard at Gasconade, Mo., and towed to Elwood, Kans.

DIKE AND REVETMENT WORK.

At St. Joseph, Mo.—In accordance with project approved August 23, 1907, the sum of $20,000 is allotted for general repairs to works in Belmont and Bonton bends above St. Joseph, Mo. Work will be begun this summer.

ELWOOD, KANS.

In accordance with project approved August 23, 1907, and shown on accompanying drawing, Plate IV,[a] all necessary plant was assembled and work commenced October 8, 1907, and actively carried on to the end of the fiscal year, as conditions of river permitted. The work was greatly handicapped on account of a dry bar that had to take time to cut away ahead of the work as it progressed and again by high water that caused a complete shut down from June 18, 1908, to end of month. Little or no work was done during the winter months, from December 20, 1907, to March 9, 1908.

The project approximates the following:

3,100 linear feet 3-row longitudinal pile dike.
300 linear feet 3-row cross dike.
3,136 linear feet 2-row cross dike.

The work accomplished to date, in addition to receiving and storing all materials necessary to complete, comprises the following and has cost to date $72,011.22:

2,050 linear feet of 3-row main longitudinal dike.
Cross dike No. 1 completed, consisting of 100 linear feet of 3-row and 251 linear feet of 2-row work.
Cross dike No. 2 completed, consisting of 100 linear feet of 3-row and 1,045 linear feet of 2-row work.
Cross dike No. 3, 100 linear feet of 3-row and 440 linear feet of 2-row work complete.

PROJECT AND ESTIMATE.

Report was submitted on April 30, 1908, as follows:

Missouri River, Kansas City to Sioux City.

6-foot project, Sioux City to Kansas City, Mo	$3,900,000
12-foot project, Sioux City to Kansas City	22,500,000
Snagging, annually	50,000
Maintenance, annually, 6-foot project	97,500
Maintenance, annually, 12-foot project	562,500

Inspections and reports were made to the Department as follows:

Kansas City, Mo.—Intake pier of waterworks, July 1, 1907.

Leavenworth, Kans.—Aerial tramway, April 11, 1908.

East approach of Leavenworth bridge, April 10, 1908.

Repair works opposite Leavenworth, October 15, 1907.

Atchison, Kans.—In compliance with instructions, a survey of the river in the vicinity of the bridge at Atchison, Kans., was made be-

[a] Not printed.

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tween September 28 and October 4, 1907, and report on same submitted to the Chief of Engineers November 4, 1907. See drawing, Plate III.

In compliance with instructions and by request of Hon. Charles Curtis, a special report concerning cost of improvement works required to force the river channel through the draw span of the bridge at Atchison, Kans., was submitted to the Chief of Engineers January 28, 1908.

Application for dike construction at Atchison, April 18, 1908.

Westenhaver jetties, or Schleuter system, April 18, 1908.

Bridge at Atchison, Kans.—In compliance with instructions, a public hearing was held at Atchison, Kans., January 3, 1908, regarding the bridge over the Missouri River at Atchison, Kans., owned by the Atchison and Eastern Bridge Company, on account of the draw span being impassable, and report of same submitted to Chief of Engineers January 20, 1908.

In compliance with instructions, original copy of notice to alter bridge at Atchison, Kans., was served on Mr. H. P. Eells, president Atchison and Eastern Bridge Company, February 24, 1908. The requirements were to dredge a channel within six months, or construct an additional draw at east end within one year.

Quarries and dumping below Plattsmouth, October 14, 1907.

Washing clay in river at Omaha, August 20, 1907.

Water power at Omaha, June 1, 1908.

Inspections of river were made by officer in charge as follows:

Sioux City to St. Joseph, August 6 to 10, 1907.
St. Joseph to Atchison, October 2, 1907.
Atchison to Leavenworth, July 1, 1908.
Parkville, Mo., to Kansas City, May 8, 1908.

FROM SIOUX CITY, IOWA, TO FORT BENTON, MONT.

Snagging.—On July 1, 1907, the snag boat *Mandan* was passing Bismarck, N. Dak., working downstream. She operated between Washburn, 42 miles above Bismarck, N. Dak., and mouth of the Cannonball River, 51 miles below Bismarck, during the month of July, 1907. During August she operated between Pierre, S. Dak., and Fort Buford, N. Dak. She was used for an inspection trip from Williston, N. Dak., to Pierre, S. Dak., September 16 to 28, inclusive.

During October and November, she operated between Pierre, S. Dak., and Sioux City, Iowa. On November 29, 1907, she was laid up for the winter in the Sioux ice harbor, where she remained until April 16, 1908, in care of watchman and undergoing slight repairs.

She was cleared upstream, from Sioux ice harbor, April 16, 1908, and arrived at point 1 mile above head of Ryan Island, 657 miles above Bismarck, N. Dak., June 30, 1908.

The work of repairs on this boat consisted of overhauling paddle wheels and machinery and various minor repairs.

Her work for the year consisted of the following:

439 snags removed from the channel.
59 miscellaneous obstructions removed from channel.
434 trees felled from caving banks.

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Expenditures during the year.

Repairing and outfitting	$1,544.
Operations	10,160.
Total	11,705.

Plant construction.—Three boat and supply yards were maintained, one at the Sioux ice harbor near Sioux City, Iowa; one at Fort Pierre, S. Dak., and one at Mandan, N. Dak., with a watchman in charge of each.

The only construction work done on this stretch of river was at Bismarck, N. Dak. In accordance with project approved March 2, 1907, and modified by Department indorsement, a force was organized and commenced the work of constructing 2,000 linear feet of standard revetment, as a continuation of the old revetment on the east side of the river below the Northern Pacific Railroad bridge, January 2, 1908, and completed same March 13, 1908, at a cost of $25,879.19. See drawing, Plate V,[a] accompanying.

EXAMINATIONS AND REPORTS.

Examinations and reports were made to the Department as follows:

Bank protection, Morton and Oliver counties, N. Dak., May 2, 1908.

Changing location of proposed dam across Missouri River, by Capital City Improvement Company, near Helena, Mont., September 23, 1907.

Dam by Ox Bow Bend Power Company, near Helena, Mont., September 24, 1907.

Dam below Great Falls, by Missouri River Improvement Company, March 6, 1908.

Work needed at Fort Pierre waterworks, July 11, 1907.

Inspections of river by officer in charge were made as follows:

Williston, N. Dak., to Bismarck, N. Dak., September 17–21, 1907.

Canon Ferry dam to Helena Canon dam, and Wolf Creek site for dam, September 13–14, 1907.

Pierre and Fort Pierre, S. Dak., November 14, 1907.

MISCELLANEOUS EXAMINATIONS.

Kaw River.—Obstruction by pipe line, September 28, 1907.

Plans for bridge over Grand River, Brunswick, Mo., November 18, 1907.

Dikes at mouth of Kaw River, January 13, 1908.

Obstruction by bridge over Big Sioux River, June 23, 1908.

Report on Winner Bridge, Union Depot Bridge, and Terminal Railway Company, March 14, 1908.

The various sand dredges operating in the Missouri River have been required to obtain regular permits for carrying on such dredging, under special restrictions as to carrying lights, etc.

Commerce.—Commerce has increased during the past year. During the summer of 1907 two boats were run by the Kansas City Transportation and Steamship Company from Kansas City to St. Louis,

[a] Not printed.

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and again during the season of 1908; also a boat from Jefferson City to St. Louis.

The trips made by the Kansas City line since beginning of this season (May 12, 1908), up to June 30, 1908, are as follows:

	Number of trips.	Cargo.		Number of trips.	Cargo.
Steamer Chester:		*Tons.*	Steamer Tennessee:		*Tons.*
Up	2	410	Up	4	770
Down	2	850	Down	4	740

Total tonnage, 2,270.

Floods.—During the month of June a disastrous flood visited the Missouri River and its tributaries, great damage being done and much land overflowed, especially in the Kaw River and Missouri River from Atchison to the mouth.

Kansas City and vicinity suffered severely. The Missouri River at the Hannibal bridge was above the danger line from June 8 to July 6, a period of four weeks. The Kaw River was above the danger line from June 9 to June 17. The damage at Kansas City is variously estimated from two to three million dollars. Hydrographs for the Missouri River at Sioux City, Kansas City, and St. Charles for 1907 and first half of 1908 are shown on Plate VI; also hydrograph for the Kaw River, June 9 to June 30, 1908.

The flood in the Kaw River registered 29.7 feet above low water on June 15, 1908, being about 5.3 feet lower than the 1903 flood. Soon after the 1903 flood a special Board of Engineer officers was appointed to consider flood conditions, who recommended that for the Kaw River the channel should not be less than 734 feet wide and 45 feet deep, this depth being based on a levee height of 30 feet above and a scour during flood 15 feet below low water. They recommended immediate action, and with a view to rapid work suggested the immediate widening to 600 feet as a preliminary toward the full width of 734 feet. Such a channel and nothing less was considered necessary for a 1903 flood.

Since 1903 no actual work has been done. A drainage board has been organized and they desire to proceed on a 734-foot width basis, but have so far been delayed by legal and other causes.

It is believed by this office that nothing less than 734 feet width and levees to a height of 30 feet above low water will satisfactorily alleviate the flood conditions in the Kaw River, and thus prevent the serious loss resulting to both Kansas City, Mo., and Kansas City, Kans.

IMPROVEMENT WORK OTHER THAN GOVERNMENT WORK.

During the year the Chicago and Alton Railroad Company rebuilt 2,000 linear feet of old revetment and built 3,000 linear feet of new revetment and 2 short pile dikes on the right bank in front of West Glasgow, Mo.

The Labadie Bottom Land Protection Association built 5 mud-cell dikes, under the David Neale system, near Boles, Mo.

The Missouri, Kansas and Texas Railway Company built about 5,000 linear feet of revetment along the left bank above their bridge at Boonville, Mo.

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The Missouri Pacific Railway Company built 2 mud-cell dikes, in accordance with the David Neale system, near Myrick, Mo., and 3 near Marion, Mo., reenforced with revetment.

The Chicago, Burlington and Quincy Railroad Company built 800 linear feet of revetment below Parkville, Mo., and protected some 3,000 feet of bank with rock.

The Atchison and Eastern Bridge Company built 600 feet pile dike on the left bank above their bridge at Atchison, Kans., to assist in forcing the current through the draw span.

The Chicago and Northwestern Railroad Company built 650 linear feet revetment on Marion Island above their bridge at Pierre, S. Dak., being an extension to similar work built by the Government, and also made some repairs to their dike and revetment work above their bridge at Blair, Nebr.

Money statements.

ABOVE SIOUX CITY, IOWA.

July 1, 1907, balance unexpended		$107,399.40
Received from sale of transferred property		5,097.12
Received from overpayments		1.50
		112,498.02
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$25,879.19	
For maintenance of improvement	20,919.33	
		46,798.52
July 1, 1908, balance unexpended		65,699.50
July 1, 1908, outstanding liabilities		4,280.20
July 1, 1908, balance available		61,419.30
Amount (estimated) required for completion of existing project		Indefinite.
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$250,000.00	
For maintenance of improvement	100,000.00	
		350,000.00
Submitted in complaince with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

BELOW SIOUX CITY, IOWA.

July 1, 1907, balance unexpended		$317,227.15
Amount allotted from emergencies in river and harbor works, act March 3, 1905		10,000.00
Amount allotted from emergencies in river and harbor works, act March 2, 1907		10,000.00
Received from sale of property		276.31
Received from sale of maps		32.49
Received from overpayments		41.20
		337,577.15
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$19,615.71	
For maintenance of improvement	104,742.15	
		124,357.86
July 1, 1908, balance unexpended		213,219.29
July 1, 1908, outstanding liabilities		37,317.02
July 1, 1908, balance available		175,902.27

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Amount (estimated) required for completion of existing project	Indefinite.
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$1,000,000.00
For maintenance of improvement	250,000.00
	$1,250,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

AT ELWOOD, KANS.

July 1, 1907, balance unexpended	[a] 50,000.00
June 30, 1908, amount expended during fiscal year for works of improvement	36,679.69
July 1, 1908, balance unexpended	13,320.31
July 1, 1908, outstanding liabilities	91.44
July 1, 1908, balance available	13,228.87

APPROPRIATIONS AND ALLOTMENTS.

IMPROVING UPPER MISSOURI RIVER, EXCLUSIVE OF THOSE FOR SNAGGING.

August 14, 1876	$20,000.00
June 18, 1878	42,500.00
March 3, 1879	60,000.00
June 14, 1880	43,000.00
March 3, 1881	92,000.00
August 2, 1882	100,000.00
July 5, 1884	140,000.00
August 5, 1886	60,000.00
August 11, 1888	200,000.00
September 19, 1890	107,088.00
July 13, 1892	152,338.47
August 18, 1894	110,000.00
March 2, 1895	40,000.00
June 3, 1896	235,000.00
March 3, 1899	205,000.00
June 13, 1902	100,000.00
June 13, 1902 (allotment)	2,000.00
March 3, 1905	75,000.00
March 3, 1907	100,000.00
March 4, 1907, deficiency act (destruction of ice gorge in Missouri River, South Dakota)	5,000.00
Total appropriations and allotments	1,888,926.47
Received from sale of condemned property	1,697.15
Received from refundment	13.05
Received from transfer of materials	5,097.12
Total	1,895,733.79

IMPROVING UPPER MISSOURI RIVER BY SNAGGING.

September 19, 1890	$192,912.00
July 13, 1892	161.53
March 3, 1893	50,000.00
August 18, 1894	50,000.00
June 3, 1896	50,000.00
March 3, 1899	50,000.00
Total	393,073.53

[a] Amount deposited by railroad companies, September 12 and October 3, 1908.

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IMPROVING MISSOURI RIVER FROM MOUTH TO SIOUX CITY, IOWA.

June 18, 1878	$265,000.0
March 3, 1879	174,000.0
June 14, 1880	232,000.0
March 3, 1881	233,000.0
August 2, 1882	850,000.0
July 5, 1884	500,000.0
August 5, 1886	375,000.0
August 11, 1888	800,000.0
February 22, 1890	75,000.0
September 19, 1890	800,000.0
July 13, 1892	600,000.0
March 3, 1893	700,000.0
August 18, 1894	700,000.0
March 2, 1895	710,000.0
June 3, 1896	300,000.0
June 4, 1897	300,000.0
July 1, 1898	300,000.0
January 5, 1899	100,000.0
March 3, 1899	300,000.0
June 6, 1900	250,000.0
June 13, 1902	175,000.0
February 18, 1904	19.3
April 28, 1904 (allotment)	50,000.0
March 3, 1905	150,000.0
March 2, 1907	300,000.0
March 3, 1905, emergencies allotted April 22, 1908	10,000.0
March 2, 1907, emergencies allotted April 22, 1908	10,000.0
Total	9,259,019.3

The total of appropriations and receipts from other sources for the Missouri River from mouth to Sioux City, Iowa, is:

Act of August 2, 1882, applied to works above Sioux City, Iowa	$4,000.00	
Survey of Missouri River from mouth to Fort Benton, act August 2, 1882	8,844.39	
Act of August 5, 1886, applied to removing obstructions from Missouri River	1,982.80	
		14,827.
Funds contributed by railroad companies		50,000.
Funds contributed by citizens of St. Joseph		50,000.
Refunded on account of overpayments, etc		3,529.
Received from transfer of materials		5,021.
Received from transfer of surplus property		7,556.
Received from sale of condemned and surplus property		12,326.
Received from sale of maps		32.
Total		9,402,313.

COMMERCIAL STATISTICS.

UPPER MISSOURI RIVER.

During the calendar year 1907 the number of boats engaged in carryi freight and passengers, exclusive of those doing a strictly ferriage business, w 10. The freight and passengers carried by them are as follows:

	Ton
Grain	9,6
Live stock	10,1
Lumber, wood, and coal	11,7
Building material and sand	11,0
General merchandise	2,5
Total	45,1

Passengers, 4; commerce of upper river expressed in mile-tons, 3,880,945.

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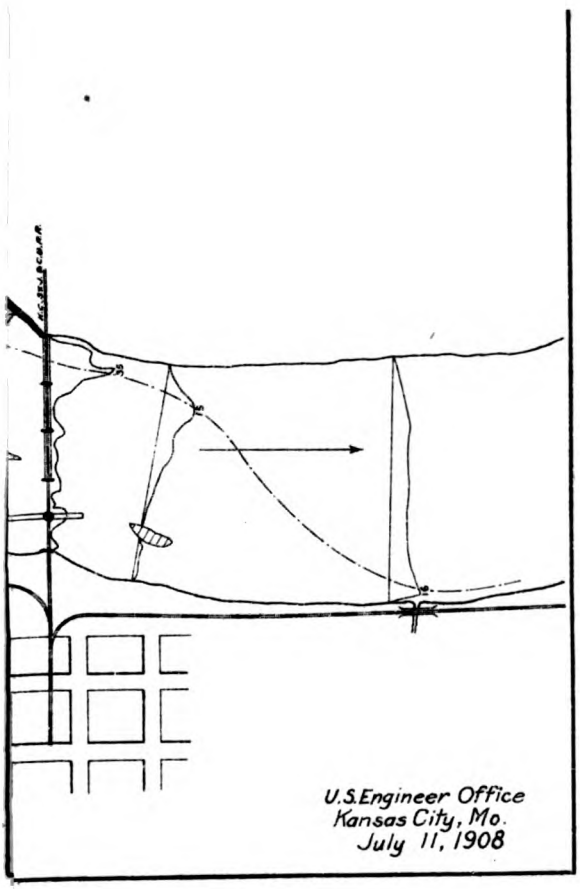

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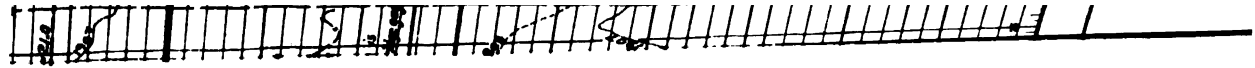

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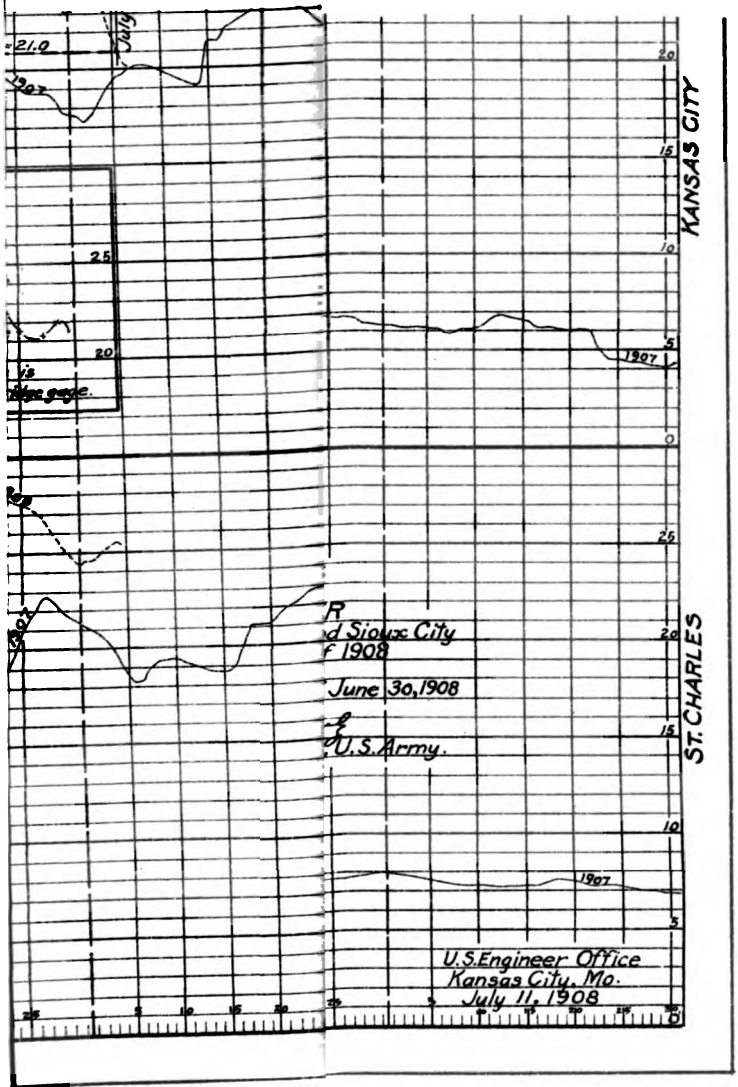

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Commerce of the Missouri River from mouth to Sioux City, Iowa, during the calendar year 1907.

The following table, giving the amount of freight carried, towed, and rafted, but not including any ferriage, is an approximation to the lower Missouri River trade for 1907:

TABLE 1.

Class.	Grain and hay.	Live stock.	Lumber, wood, and ties.	Building material, sand, and coal.	General merchandise.	Total.	Mile-tons.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	
Long-trade packets	3,075	110	1,958	331	3,273	8,792	1,721,406
Short-trade packets, miscellaneous boats, etc	9,698	1,183	2,797	5,622	555	19,855	258,650
Sand steamers and barges	.....	.....	.....	782,976	.....	782,976	299,184
Rafts	.....	.....	13,439	.....	.....	13,439	705,310
Riprap, willows, and lumber used by private parties for bank protection in vicinity of St. Joseph and Kansas City, Mo	.....	.....	.....	18,801	.....	18,801	24,051
Total	12,773	1,293	18,189	807,780	3,828	843,863	3,008,601

Two thousand five hundred and thirty-two passengers were carried.

The following table gives the total, in tons, for the different classes of trade during the last eight years for the lower Missouri:

TABLE 2.

Class.	1907.	1906.	1905.	1904.	1903.	1902.	1901.	1900.
Long-trade packets	8,792	.....	.....	4,677	2,376	7,989	7,806	4,397
Short-trade packets, etc	19,855	34,332	23,468	19,480	51,505	88,051	87,588	34,787
Sand and wood steamers and barges	782,976	471,173	805,373	402,149	678,878	334,164	463,340	282,395
Rafts	13,439	14,368	550	4,459	1,985	12,073	10,935	5,727
Mattress brush, stone, and dike material for bank-protection work	18,801	53,475	14,044	24,285	15,547	18,250	.....	.....
Total	843,863	573,348	843,435	455,000	750,291	410,527	569,669	277,306

TABLE 3.—*Comparative commerce of the lower Missouri River, expressed in mile-tons.*

Class.	1907.	1906.	1905.	1904.	1903.	1902.	1901.	1900.
Long-trade packets	1,721,406	.....	.....	971,315	494,746	1,435,605	999,116	558,807
Short-trade packets, etc	258,650	1,215,415	307,968	892,568	1,250,966	626,925	1,039,767	360,378
Sand and wood steamers and barges	299,184	43,236	284,649	441,043	149,994	429,492	668,783	460,440
Rafts	705,310	260,186	50,200	117,810	95,911	570,137	196,872	103,975
Mattress brush, stone, and dike material for bank-protection work	24,051	805,542	117,327	317,920	287,714	164,750	.....	.....
Total	3,008,601	2,324,379	760,144	2,240,656	2,229,331	3,226,909	2,903,538	1,483,600

B B 2.

IMPROVEMENT OF OSAGE RIVER, MISSOURI.

The work on this river consists in the construction of one lock and dam about 8 miles above the mouth and of open river improvement

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by longitudinal and cross dikes from the mouth to the mouth of Niangua River, a distance of 109 miles.

The revised project for completing the lock and dam was approved by the Department June 20, 1907. It is identical with the report and recommendations of the special Board of Engineers of September 11, 1906, modified by revised project of June 20, 1907, and subsequently by E. D. 10588–89. The project is based on a cost of $228,000, as provided for by the act of March 2, 1907, as follows:

Improving Osage River, Missouri: Continuing improvement and for maintenance, seventy-eight thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such material and work as are necessary for the completion of said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and sixty thousand dollars, in addition to the amounts herein and heretofore appropriated.

Of the total amount, $10,000 has been set aside for general river improvement.

The report of September 11, 1906, contemplated:

a. The protection of lock wall by crib 20 feet wide and 12 feet deep.

b. Coffering of Lock and Weir 1, concrete placed under floor and against sheet piling and around piling caps to 3 feet depth, space between drum and apron crib filled with concrete, and placing of apron crib.

c. Coffering of Weirs 6, 7, 8, and 9, and concreting same as *b*.

d. Construction of Chanoine Dam between Weirs 1 and 6, 415 feet, with sills 109 feet and top of wicket 116 feet.

a and *b* have been completed, and it is proposed to work on *c* during the coming season, and also make preparations for *d*.

e. In addition, new steel gates to replace the wooden ones will be added as the work nears completion.

Plant.—During the year repairs were made to the centrifugal pumps and other machinery, derricks erected, tracks built, and decks of three barges repaired. The steamer *Osage* (formerly *H. M. Robert*) was brought down from Sioux City for general use in towing barges and transporting material from Osage to the site of the lock and dam.

A drawing is transmitted herewith, marked Plate VII,[a] giving conditions at the lock and dam at the beginning of the fiscal year and at the close.

The upper dam was 654 feet long, of two rows of piles 11 feet center to center of rows, and 8 feet center to center of piles, the inside row being double 3-inch sheeting and outside row single 3-inch sheeting.

Considerable trouble was encountered, as portions of old dam had to be removed under 9 feet of water.

The pumping was a large item, as almost the entire inclosed area has been scoured to 93 feet, or about 8 feet below orignal river bottom. Two 8-inch, one 12-inch, and one 15-inch pumps were used, actual total capacity about 18,000 gallons per minute. These managed to keep the water down against a head of average 14 feet.

Sediment in lock chamber.—About 9 feet depth had accumulated. The mud and water were pumped out and lock unwatered to a level of lower miter sill. About 2,700 yards of mud were removed. The floor of the lock was found intact, and leakage was materially reduced by means of the crib and sheeting along lock wall.

Excavation was made under platform of weir 1 and pier 1, and 446 cubic yards concrete placed underneath and in rear of weir. A

[a] Not printed.

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double-lap sheet piling was driven just outside of pier 1 and across line of dam for future use in coffering off central portion of dam. A crib apron was placed on downstream side.

A protection crib along lock wall 20 feet wide, 212 feet long, and to an elevation of 105. A row of triple-lap sheet piling was driven to outside of crib. The old crib dam of 245 feet length was lowered to about 104.75 all around and sheet piling cut off. The wooden lock gates were repaired as well as possible. It is proposed to replace them with steel gates in the near future.

Material has been purchased and stored, with a view to operations the coming season of coffering off weirs 7, 8, 9, and 10, and placing concrete underneath and in rear and placing of a crib apron on downstream side.

The highest water of the year was on June 20, 1908, which reached 125.4 feet, being 1 to 1.5 feet over the bank and 5.4 feet over lock wall.

GENERAL IMPROVEMENT OF RIVER.

During the past winter and spring a barge 25 by 100 feet was repaired at Gasconade, Mo., and towed to the lock. A derrick and cabin was erected thereon, and boiler, steam hoist, and capstans placed and fitted up, to be used as a clam-shell dredge.

A barge 30 inches by 14 by 48 feet is now under course of construction.

Twelve hundred cubic yards of gravel were dredged from the channel at the foot of Shipley shoal.

It is proposed during the coming season to expend the funds available by dredging and dike construction, beginning at Tuscumbia and proceeding downstream.

Money statement.

July 1, 1907, balance unexpended	$107,779.10
Amount appropriated by sundry civil act approved May 27, 1908	100,000.00
	207,779.10
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	55,421.60
July 1, 1908, balance unexpended	152,357.50
July 1, 1908, outstanding liabilities	8,745.85
July 1, 1908, balance available	143,611.65
Amount (estimated) required for completion of existing project	[a] 60,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	[a] $60,000.00
For maintenance of improvement	20,000.00
	80,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS AND ALLOTMENTS.

March 3, 1871	$25,000.00
June 10, 1872	25,000.00
March 3, 1873	25,000.00
June 23, 1874	25,000.00
June 18, 1878	20,000.00

[a] For lock and dam.

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March 3, 1879	$20,000.00
June 14, 1880	30,000.00
March 3, 1881	20,000.00
August 5, 1886	10,000.00
August 11, 1888	5,000.00
September 19, 1890	55,000.00
July 13, 1892	50,000.00
August 18, 1894	46,000.00
June 3, 1896	50,000.00
March 3, 1899	25,000.00
June 6, 1900	146,000.00
June 13, 1902	30,000.00
March 3, 1905	80,000.00
Allotted from emergency appropriation, river and harbor act of March 3, 1905	10,000.00
Allotted from appropriation act of June 13, 1902	10,000.00
March 2, 1907	78,000.00
Refundment on account of overpayment	15.83
Received from sale of property	316.00
Act May 27, 1908, sundry civil bill	100,000.00
Total	885,331.83

COMMERCIAL STATISTICS.

The steamboat traffic on the Osage River was performed principally by the steamers *J. R. Wells, Sissor Bill, and G M.*

TABLE 1.—*Close approximation to the amount of river trade during 1907.*

Class.	Grain and hay.	Live stock.	Lumber and wood.	Railroad ties.	Building material and sand.	General merchandise.	Total.	Mile-tons.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	
Packets	2,935	455	576	.....	10,780	1,726	16,472	818,280
Rafts	.....	.....	.....	15,129	.....	.....	15,129	817,820
Total	2,935	455	576	[a]15,129	10,780	1,726	31,601	1,136,100

[a] This amount was reported by tie contractors, but it is believed that it does not represent over a third of the ties shipped out of the Osage River.

TABLE 2.—*Comparative statement of the commerce of the river, expressed in tons, from 1907 to 1899.*

Shipments.	1907.	1906.	1905.	1904.	1903.	1902.	1901.	1900.	1899.
Hay and grain	2,935	2,494	1,092	466	1,498	6,000	4,232	8,722	4,077
Live stock	455	1,487	141	827	489	153	1,058	934	878
Lumber, wood, and ties	15,705	11,644	5,983	18,375	24,256	74,385	56,221	76,583	57,668
Building material and gravel	10,780	474	204	14,573	10,639	12,369	8,000	7,500	9,945
General merchandise, farm machinery, etc.	1,726	4,407	1,164	1,430	1,534	2,284	2,738	2,335	4,144
Barytes	.....	.....	94	75	85	3	90	70	.....
Total	31,601	20,506	8,678	35,746	38,501	95,194	72,339	96,144	76,732

TABLE 3.—*Comparative commerce of the river, expressed in mile-tons, from 1907 to 1899.*

Class.	1907.	1906.	1905.	1904.	1903.	1902.	1901.	1900.	1899.
Packets	318,280	362,006	557,195	294,104	263,018	675,705	277,106	545,107	393,135
Rafts, etc	817,820	457,074	158,000	980,416	970,723	3,334,065	2,425,710	3,060,215	2,968,192
Total	1,136,100	819,080	715,195	1,274,520	1,233,741	4,009,770	2,702,816	3,605,322	3,361,327

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B B 3.

IMPROVEMENT OF GASCONADE RIVER, MISSOURI.

For the improvement of this stream the general project, adopted in 1880, was followed this season. It contemplated the removal of snags from the channel and of overhanging trees from the banks of the river, and the construction of wing dams and training walls, to concentrate the flow of water upon the shoals, to increase the depth at those points.

On July 1, 1907, the available cash balance of the current appropriation amounted to $9,141.02.

A construction party was at work at the beginning of the present fiscal year in the vicinity of Pryors Island, working under an approved detailed project covering 46 miles of river from the mouth.

The season's work ended December 14, 1907, on which date the plant arrived at the Gasconade boat yard and was placed in storage.

The following work was accomplished:

Pryors Bend (32 miles from mouth).—The dam at head of Pryors Mill Chute was lengthened 210 feet, to join up with new bank line of Pryors Island, which had been scoured out at end of old dam, and 175 linear feet of new dam was built around a wrecked portion of the old dam. Two hundred and sixty-seven feet of the old dam was built up from 1½ to 2½ feet in height, restoring it to grade.

To reenforce the dam across the head of Pryors Mill Chute a second dam was built across the chute just above the mill site, this dam being 196 feet long, 12 feet wide at base, 10½ feet wide at top, and having an average depth of 6 feet.

Clay Bank shoals (34 miles from mouth).—A 47-foot breach in this dam near the left bank was closed with fascines and crib work, and the trail dam on the left side of the river was extended downstream 159 feet.

Sand shoals (35 miles from mouth).—The work here consisted of raising the dam on left bank, 493 feet long, 14 inches, and that on the right bank, 100 feet long, 12 inches, restoring them to grade, and extending the trail of the dam on the left bank 122 feet downstream.

Cooper Hill (39½ miles from mouth).—A crib dam was built above the steamboat landing at this place, extending out from the left bank 109 feet, with a trail dam 359 feet long.

Between the mouth and Cooper Hill 54 snags and 4 submerged rocks were removed from the channel.

It is proposed to expend the available balance in improving Pryors Bend during the coming season.

Money statement.

July 1, 1907, balance unexpended	$9,918.70
June 30, 1908, amount expended during fiscal year for maintenance of improvement	7,760.54
July 1, 1908, balance unexpended	2,158.16

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Amount (estimated) required for completion of existing project..... Indefinite.

Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:
For works of improvement..... $20,000.00
For maintenance of improvement..... 7,500.00
$27,500.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS AND ALLOTMENTS.

June 14, 1880	$5,000.00	June 13, 1902	$10,000.00
March 3, 1881	10,000.00	Allotted by Secretary of War from act of June 13, 1902	1,000.00
August 2, 1882	10,000.00	March 3, 1905	15,000.00
July 5, 1884	5,000.00	March 2, 1907	10,000.00
August 5, 1886	7,500.00	Received from sale of condemned property	124.31
August 11, 1888	5,000.00		
September 19, 1890	4,000.00	Total	111,624.31
July 13, 1892	4,000.00		
August 18, 1894	5,000.00		
June 3, 1896	5,000.00		
March 3, 1899	15,000.00		

COMMERCIAL STATISTICS.

The steamboat traffic on the Gasconade River was carried on principally by the steamers *W. L. Heckmann*, *Henry Wohlt*, and *Julius F. Silber*, carrying 500 passengers.

TABLE 1.—*Close approximation to the amount of river trade during the year 1907.*

Class.	Grain and hay.	Live stock.	Lumber and wood.	Railroad ties.	Building material.	General merchandise.	Total.	Mile-tons.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	
Packets	4,560	400	1,611	900	350	695	8,516	340,640
Rafts	.....	.....	1,375	40,192	.....	.....	41,567	2,394,600
Total	4,560	400	2,986	41,092	350	695	50,083	2,735,240

TABLE 2.—*Comparative statement of the commerce of the river, expressed in tons, from 1907 to 1899.*

Shipments.	1907.	1906.	1905.	1904.	1903.	1902.	1901.	1900.	1899.
Grain and hay	4,560	4,235	3,764	1,896	196	4,446	2,437	4,796	2,108
Live stock	400	539	242	227	15	167	485	256	414
Lumber, wood, and railroad ties	44,078	21,786	22,814	11,733	10,551	28,305	14,869	15,504	19,864
Building material	350	528	82	93	2	9,845	418	166	6
General merchandise, farm machinery, etc	695	751	2,735	842	24	1,617	1,251	859	1,875
Total	50,083	27,604	29,837	14,791	10,788	44,380	19,460	21,580	24,250

TABLE 3.—*Comparative commerce of the river, expressed in mile-tons, during the years 1907 to 1899.*

Class.	1907.	1906.	1905.	1904.	1903.	1902.	1901.	1900.	1899.
Packets	340,640	159,150	425,285	226,247	9,139	1,231,183	869,223	236,992	307,376
Rafts	2,394,600	405,629	1,172,895	664,680	691,500	2,508,270	1,847,300	1,187,280	1,079,753
Total	2,735,240	564,779	1,598,180	890,927	700,639	3,739,453	1,716,523	1,424,272	1,387,129

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APPENDIX C C.

IMPROVEMENT OF RIVERS AND HARBORS IN THE NASHVILLE, TENNESSEE, DISTRICT.

REPORT OF MAJ. WM. W. HARTS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Obion and Forked Deer rivers, Tennessee.
2. Cumberland River, Tennessee and Kentucky.
3. Operating and care of locks and dams on Cumberland River, Tennessee.
4. Caney Fork River, Tennessee.
5. Removing sunken vessels or craft obstructing or endangering navigation.

ENGINEER OFFICE, UNITED STATES ARMY,
Nashville, Tenn., July 18, 1908.

SIR: I have the honor to transmit herewith the annual report * * * upon the river improvements in my charge relating to the Nashville, Tenn., district for the fiscal year ending June 30, 1908.

Very respectfully,

WM. W. HARTS,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

C C 1.

IMPROVEMENT OF OBION AND FORKED DEER RIVERS, TENNESSEE.

(A) OBION RIVER.

During the past fiscal year the snagging outfit was overhauled and repaired and on September 21, 1907, a snagging party was sent out to remove channel obstructions, beginning at Obion, Tenn., and moving downstream. The work was carried on until November 1, when the season's work was completed, a distance of 69 miles having been cleared. The fleet then passed into the Forked Deer River to commence the season's work of snagging on that stream. The following are the details of the work:

Snags removed	606
Snags cut	552
Leaning trees cut	593
Trees deadened	409
Logs cut	765

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In view of the cost of the extensive repairs to the floating plant and snagging outfit now found necessary to further carry on this improvement, and in view of the meager benefits resulting from this work in the past, it is not believed that further appropriations under this project are warranted.

About nine-tenths of the commerce consists of timber products floated out at high water, for which the works of improvement are not of much benefit.

Money statement.

July 1, 1907, balance unexpended	$2,247.[illegible]
June 30, 1908, amount expended during fiscal year for maintenance of improvement	1,034.[illegible]
July 1, 1908, balance unexpended	1,213.[illegible]
July 1, 1908, outstanding liabilities	13.[illegible]
July 1, 1908, balance available	1,200.[illegible]

APPROPRIATIONS.

July 13, 1892	$7,500
August 18, 1894	7,500
June 3, 1896	6,000
March 3, 1899	2,500
June 13, 1902 (allotment dated July 7, 1902)	2,500
March 3, 1905 (allotment dated April 15, 1905)	1,700
March 2, 1907 (allotment dated March 27, 1907)	1,700
Total	29,400

COMMERCIAL STATISTICS.

[From January 1 to December 31, 1907.]

	Tons.
Logs	12,000
Lumber	14,222
Cotton	25
Total	26,247
Estimated value	$115,109

List of steamboats (stern-wheel) plying upon Obion River, calendar year 1907.

Name.	Registered dimensions.			Net tonnage.
	Length.	Breadth.	Depth.	
Caruthersville	71.0	18.0	2.5	6[illegible]
Clyde [a]	46.0	12.0	3.1	1[illegible]
Iona [a]	50.4	11.3	2.0	[illegible]
J. M. Linder	100.0	18.0	4.0	1[illegible]
Joy Patton	100.0	21.3	5.6	[illegible]

[a] Gasoline.

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(B) FORKED DEER RIVER.

The season's work on this stream was begun on November 1 and ended November 30, 1907, a distance of 28½ miles of river having been cleared of obstructions, after which the fleet was moored at Dyersburg, in charge of a watchman. The details of the work were as follows:

Snags removed	206
Snags cut	411
Leaning trees cut	329
Trees deadened	87
Logs cut	439

Money statement.

July 1, 1907, balance unexpended	$1,716.21
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	731.04
July 1, 1908, balance unexpended	985.17
July 1, 1908, outstanding liabilities	11.50
July 1, 1908, balance available	973.67

APPROPRIATIONS.

By act of—	
August 2, 1882, for South Fork	$3,000
July 5, 1884, for South Fork	2,000
August 5, 1886, for South Fork	5,000
August 11, 1888, for South Fork	2,500
August 11, 1888, for North Fork	4,500
August 11, 1888, for main river	2,500
September 19, 1890, for North Fork and main river	2,500
July 13, 1892, for Forked Deer (completing improvement)	3,000
Total to complete old project	25,000
Present project, by act of—	
June 3, 1896	1,000
June 3, 1896, for North Fork of Middle Fork from Dyersburg to Mississippi River	5,000
March 3, 1899	2,000
June 13, 1902 (allotment, dated July 7, 1902)	2,000
March 3, 1905 (allotment, dated April 15, 1905)	1,300
March 2, 1907 (allotment, dated March 27, 1907)	1,300
Total	12,600

COMMERCIAL STATISTICS.

[From January 1 to December 31, 1907.]

	Tons.
Logs	4,000
Lumber	8,953
Cotton	25
General merchandise	80
Total	13,058
Estimated value	$53,891.00
Passengers	400

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Comparative statement of traffic on Obion and Forked Deer rivers for seven years.

Calendar year.	Tons.	Calendar year.	Tons.
1901	26,717	1905	58,2
1902	117,415	1906	22,1
1903	22,576	1907	29,2
1904	60,286		

List of steamboat (stern-wheel) plying upon Forked Deer River, calendar year 1907.

Name.	Registered dimensions.			Net tonnage.
	Length.	Breadth.	Depth.	
Caruthersville	71.0	18.0	2.5	4
Clyde[a]	46.0	12.0	3.1	1
Iona[a]	50.4	11.3	2.0	1
J. M. Linder	100.0	18.0	4.0	3
Joy Patton	100.0	21.3	5.6	6

[a] Gasoline.

C C 2.

IMPROVEMENT OF CUMBERLAND RIVER, TENNESSEE AND KENTUCKY.

(A) BELOW NASHVILLE, TENN. (193 MILES).

During the fiscal year ending June 30, 1908, $12,669.34 were expended, of which $9,781.88 were applied to the survey for the sites of new locks and dams and $2,887.46 to maintenance of improvement.

The survey party has run a line of levels from Lock A to Smithland, Ky., a distance of 149.7 miles, and the sites for Locks C and D have been developed, and lock site E partially developed. A preliminary report on this survey has been submitted, to which reference is made on page 560 of the current summary. It is expected to complete the location and development of lock sites E and F, the last of the series, during the present summer, and submit the final report for submission to the next session of Congress.

The snag boat *Apex* was sent out September 16, 1907, to do the season's snagging on the lower Cumberland. The season's work was terminated on October 18, a distance of 193 miles having been cleared below Nashville. The following are the details of the work:

Snags removed	244
Snags cut	97
Leaning trees cut	1,428
Trees deadened	24
Logs cut	400

A biennial appropriation of at least $10,000 should be made for clearing this section of surface obstructions, the sums heretofore allotted being inadequate for the effective work of maintenance required.

The Board of Engineers for Rivers and Harbors having reported in favor of continuing the improvement of the Cumberland River

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below Nashville (H. Doc. No. 699, 59th Cong., 1st sess.) it is very important that provision be made at once for purchasing the necessary lock sites and for commencing work on Locks B and C. It is therefore recommended that an appropriation of $390,000 for this purpose and $10,000 for maintenance be made for the fiscal year 1910.

Money statement.

July 1, 1907, balance unexpended		$21,400.78
June 30, 1908, amount expended during fiscal year:		
For works of improvement (survey)	$9,781.88	
For maintenance of improvement	2,887.46	
		12,669.34
July 1, 1908, balance unexpended		8,731.44
July 1, 1908, outstanding liabilities		897.92
July 1, 1908, balance available		7,833.52
Amount (estimated) required for completion of existing project		1,549,818.81
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$390,000.00	
For maintenance of improvement	10,000.00	
		400,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

IMPROVING CUMBERLAND RIVER BELOW NASHVILLE, TENN., UNDER OLD PROJECT FOR OPEN-CHANNEL WORK, FROM 1871 TO 1890.

Act of—		Act of—	
March 3, 1871	$30,000	August 5, 1882	$15,000
June 10, 1872	20,000	July 5, 1884	7,500
March 3, 1873	25,000	August 5, 1886	12,500
March 3, 1875	25,000	August 11, 1888	10,000
June 18, 1878	45,000	September 19, 1890	40,000
March 3, 1879	40,000		
June 14, 1880	20,000	Total	305,000
March 3, 1881	15,000		

UNDER NEW PROJECT FOR LOCKS AND DAMS, FROM 1892 TO 1907.

Act of—		
July 13, 1892	$40,000.00	
August 18, 1894	30,000.00	
June 3, 1896	80,000.00	
March 3, 1899	100,000.00	
Amended act of June 13, 1902	180,000.00	
Act of March 3, 1905	10,000.00	
		$440,000.00

RECEIPTS FROM SALES AND REDEPOSITS.

Received, account of sales	$970.90	
Cash deposit taken up, pay due sundry persons uncalled for	3.15	
		974.05
Total		440,974.05

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COMMERCIAL STATISTICS.

[Open river.]

Cumberland River below Nashville, Tenn., from January 1 to December 31, 19

	Tons.		Tons.
Logs	5,943	Lime and cement	
Lumber	4,695	Live stock, large	
Railroad ties	219,917	Live stock, small	1,
Poles and posts	802	Fertilizers	1,
Hoop poles	800	Fluorspar	
Spokes	412	Mussel shells	1,
Handles	563	General merchandise	20,
Tobacco	2,520		
Grain	32,640	Total	300,
Other farm products	3,480		
Iron, manufactured	500	Estimated value	$5,877,
Sand and gravel	1,800	Passengers carried	14,

(For commerce passing Lock A, see commercial statistics, "Operating an care," etc.)

Comparative statement of traffic for seven years.

Calendar year.	Tons.	Calendar year.	Tons.
1901	255,557	1905	255,
1902	263,531	1906	222,
1903	297,488	1907	300,
1904	275,871		

List of steamboats (stern-wheel) plying on the Cumberland River below Nash ville, Tenn., calendar year 1907.

Name.	Registered dimensions.			Net ton nage.
	Length.	Breadth.	Depth.	
	Feet.	*Feet.*	*Feet.*	
Albany	120.0	21.0	2.5	
Blue Spot	115.6	23.6	3.7	
Bob Dudley	160.0	29.0	3.8	
Castalia	110.0	26.2	3.7	
C. M. Pate	111.6	22.4	4.0	
Chancy Lamb	136.0	25.8	4.5	
Charles Turner	104.0	20.8	3.0	
E. Douglas	112.0	24.0	4.0	
Electra	170.0	35.0	5.2	
H. W. Buttorff	160.0	30.0	4.1	
Harth	109.4	20.0	3.2	
Henrietta	130.0	24.0	4.1	
Henry Harley	160.0	29.0	3.2	
Hosmer	95.6	18.4	3.6	
I. N. Hook	109.9	19.4	3.0	
Inverness	129.0	21.0	4.8	
J. B. Richardson	165.0	29.0	4.0	
Jim T. Duffy, Jr	120.0	26.0	3.8	
J. S	175.0	33.0	5.5	
John W. Love	120.0	20.0	4.0	
John S. Summers	108.2	21.3	3.4	
Little Ben[a]	45.0	11.0	1.5	
Little Tip[a]	50.0	16.0	2.5	
Lyda	122.0	24.0	2.4	
Mackie	120.0	20.6	3.5	
Mary A. Anderson	100.0	27.0	3.7	
Mary M. Michael	143.0	26.3	4.4	
Martha H. Hennen	112.0	23.0	4.8	
Margaret	100.0	22.0	3.0	
Monie Bauer	78.0	17.5	3.0	
Nellie	120.0	26.0	4.0	
R. Dunbar	160.0	29.0	6.4	
Russell Lord	160.0	30.0	5.0	
Scotia	100.5	13.4	3.0	
Sycamore	108.6	20.3	3.0	
W. T. Hardison	106.7	21.9	3.9	
Vincennes	98.5	20.0	3.3	

[a] Gasoline.

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(B) ABOVE NASHVILLE, TENN. (357 MILES).

The amount expended under the existing project during the fiscal year ending June 30, 1908, was $184,305.78, the disbursements being distributed as follows:

Lock and Dam No. 2		$14,046.22
Locks and Dams Nos. 3, 4, 5, 6, and 7:		
Lock No. 3	$57,381.36	
Lock No. 4	12,900.61	
Lock No. 5	51,913.59	
Lock No. 6	1,899.63	
Lock No. 7	1,899.58	
		125,994.77
Lock and Dam No. 21		40,322.38
Maintenance		3,942.41
Total		184,305.78

The following is an account of the work done:

Lock No. 2 (9 miles above Nashville).—Work was carried on with a hired labor force. Numerous local rises very materially retarded the work of building the dam, which was closed, and lock put into operation October 9, 1907.

The work done comprised dredging 17,540 cubic yards of sand and gravel from the lower approach at a cost of 6 cents per cubic yard, quarrying 159 cubic yards of paving, removing cofferdam and 829 cubic yards of mud from lock pit, excavating 550 cubic yards from terreplein so as to place the paving, placing 401 cubic yards of paving on the terreplein at a cost of $2.47 per cubic yard; about 300,000 feet B. M. lumber were placed in the dam and 2,034 cubic yards of stone filling, at an average cost of $3.21 per M feet B. M. for lumber and $1 per cubic yard for rock filling, making the entire cost of the dam $23,073.02, exclusive of excavating the gravel and mud overlying the rock on which the dam rests. A lockman's house was completed at a cost of $3,616.64; a flatboat was built at a cost of $61.39 and a barge converted into a quarter boat for the survey party on the lower Cumberland River at a cost of $375.31; a quarter boat was built for the Caney Fork River at a cost of $1,198.71; gauges were cut on lock walls at a cost of $4.33 per linear foot; minor repairs were made and floating plant cared for. Upon completion of Dam No. 2 the force and plant were moved to Lock No. 3.

Locks 3 to 7.—Proposals were solicited November 14, 1907, for the delivery of 1,258,695 feet B. M. yellow-pine lumber for Dams Nos. 3 and 5, about 506,491 feet B. M. being required for Dam No. 3 and 752,204 feet B. M. for Dam No. 5. Seventeen proposals were received. Award was made to J. K. Joice, of Chicago, Ill., for delivering on board barges at Nashville, Tenn., at $25.25 per 1,000 feet B. M. All the deliveries were to have been finished by May 1, 1908, but the contractor was given a reasonable time after this date for sufficient cause. At the close of the fiscal year practically all the lumber for Dam 3 is on hand, and the greater portion of the Dam 5 deliveries also. Preparations are made to finish both dams this summer, which should be accomplished unless the state of the river interferes.

Under the contract with the Penn Bridge Company the gates and filling valves for Locks 3, 4, and 5 and the filling valves for Locks 6

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and 7 have been delivered. The work of erecting the gates at Locks 3, 4, and 5 will begin as soon as the stage of water will permit.

The U. S. steamers *Cumberland*, *Henry*, and *John* were employed in towing material and supplies in connection with the work of improvement. The steamers *John* and *Henry* were placed on the ways of the Paducah Marine Railway Company at Paducah, Ky., and repaired at a cost of $2,768.54 for the former and $3,398.75 for the latter. The United States dredge was also found to be in need of extensive repairs and was sent on the ways at Paducah. At the close of the fiscal year the repair work was completed at a cost of $6,964.12, half of which is chargeable to the funds for operating and care of the locks and dams on the Cumberland River.

Lock No. 3 (26 miles above Nashville).—The force was engaged in the work preparatory to placing this lock in operation. The following are the details of the work done: Moved engineer property from Lock 2 to Lock 3; erected trestle and built cribs for derricks; built barge 100 by 22 by 5 feet, at a cost of $2,416.68; built shed for storing cement; dredged 9,140 cubic yards of sand and gravel from the lower approach and foundation for dam and guard wall, at a cost of 10 cents per cubic yard; quarried 2,891 cubic yards of stone for dam, at a cost of $1.41 per cubic yard; delivered 3,563 cubic yards of stone for dam, at a cost of 44 cents per cubic yard; prepared masonry for reception of lock gates; drilled 392 lineal feet of holes for anchor bolts, at a cost of about $1 per lineal foot; repaired 6 barges, at a cost of $2,548.87; unloaded and stored 453,627 feet B. M. of lumber, at a cost of 91 cents per thousand feet B. M.; unloaded and stored 1,308 cubic yards of sand and gravel, at a cost of 40 cents per cubic yard; repaired and cared for most of the floating plant.

Lock No. 4 (44.7 miles above Nashville).—The force was employed in the work preparatory to placing this lock in operation. During the low-water season of 1907 work was carried on with a hired labor force and consisted of drilling 800 feet of holes for anchor pins and rods and placing and grouting the same; excavating 1,300 cubic yards of mud for cofferdam and guard wall, at a cost of 48 cents per cubic yard, including cost of cofferdam; building reenforced concrete guard wall, containing 830 cubic yards, at a cost of $11.60 per cubic yard for labor, forms, and material; cutting gauges on lock walls, and repairing Government road.

Lock No. 5 (72 miles above Nashville).—The force was engaged on the work preparatory to placing this lock in operation. The following are the details of the work: Erected derricks and installed machinery; repaired tram tracks; graded tram track from quarry to bluff; excavated 500 cubic yards under the bluff to receive stone; prepared masonry for the reception of the gates, valves, etc.; drilled 755 lineal feet of holes for anchor bolts, at a cost of 42 cents per lineal foot; unloaded and stored 850,816 feet B. M. of lumber, at a cost of 79 cents per thousand feet B. M.; quarried 950 cubic yards of stone for dam, at a cost of $1.35 per cubic yard; built a shed for storing cement; built cofferdam at lower end of lock; rebuilt eight tram cars; unloaded and stored 1,315 cubic yards of sand and gravel for guard wall, at a cost of 25 cents per cubic yard; repaired and cared for floating plant.

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Lock No. 21 (296¼ miles above Nashville).—The following work was done under contract with the Continental Engineering and Contracting Company from July 1 to December 11, 1907, the date when operations were suspended under this contract:

Earth excavation	cubic yards	2,585.0
Rock excavation	do	1,072.4
Embankment	do	733.8
Concrete	do	5,232.5
Riprap	do	1,202.3
Stone filling	do	514.8
Puddling	do	234.4
Placing irons	pounds	16,850

For contract prices, see page 1692 of this report.

A concrete retaining toe wall 75 feet long, containing 75 cubic yards of concrete, with the necessary excavation and embankment, was built by the contractor on the bank below the guide wall at a cost of $850.

A supplemental contract was made with the contractor for the construction of a concrete guide wall for the lump sum of $22,292. Practically nothing has been done on this wall.

Work under the contract with the Continental Engineering and Contracting Company has not been satisfactory. After having carried on the work for about two years without much success, the contractor became financially unable to proceed with his contract, whereupon the contract was annulled by the authority of the Chief of Engineers in May, 1908. A hired-labor force was organized the latter part of May and sent to Lock 21 to take charge of the work. At the close of the fiscal year the United States had taken possession of the contractor's plant under contract rights, and the working force had repaired and pumped out the cofferdam, replaced machinery, and overhauled the plant preparatory to the resumption of active operations. Work will be carried forward on the lock walls and lower guard wall, and paving for bank protection on the lock side will be continued.

Proposals were solicited by newspaper advertisement for the construction of the lockmaster's frame house, but none were received. Authority has been granted to do the work by hired labor.

The balance available, about $216,000, for the completion of the lock, abutment, and Dam No. 21, is found after two years' experience in handling work at this site to be inadequate, as it is found necessary to considerably increase the amount of bank protection and paving for the greater protection of the structures. The lock, and more especially the abutment, are subject to flanking by the river at high stages, especially after the construction of the dam, which, having a lift of about 19½ feet, may be expected to increase the action on the banks at medium and high stages. It is proposed to do the necessary protection work on the banks before building the dam, as it is deemed inadvisable and unsafe to complete the dam before the banks are secure. It is estimated that the additional necessary protection work will cost about $44,000.

A new estimate for building the dam is submitted herewith, as the contractor's prices for doing this work were considerably below what the work can now be done for. The items are as follows:

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5,000 cubic yards concrete in place, including forms, at $10 per cubic yard	$50,000
Building cofferdams	18,000
Preparing foundations	3,000
Pumping cofferdams	2,000
Removing cofferdams to other portions of the dam	4,000
Total	77,000

To arrive at the cost of completion beyond any uncertainty there should be added to the new cost of the dam the estimate for the proposed additional bank protection, viz, $44,000, making a total of $121,000. From this should be deducted the present estimated cost of the dam as covered by the former contract, viz, $35,663.15, leaving $85,336.85 still necessary for the additional appropriation, or $85,000 in round numbers. It is therefore recommended that an additional appropriation of this amount be made for the fiscal year 1910, leaving the excess of cost of work covered by the former contract to be subsequently recovered from the sureties to the contract.

The contractor for the lock gates and maneuvering appliances completed the delivery of all material February 13, 1907. The gates can not be placed until the masonry work is finished, causing delay in completing this contract.

Snagging.—The snag boat *Apex* began snagging the river 69 miles below Burnside, Ky., the section between Burnside and that point having been worked over during the fiscal year 1907. The *Apex* cleared 175 miles of river above Nashville, the following being the details of the work:

Snags removed	643	Trees deadened	85
Snags cut	210	Logs cut	378
Leaning trees cut	830		

A biennial appropriation of at least $10,000 should be made for clearing the Cumberland River above Nashville of surface obstructions, the sums heretofore allotted being inadequate for effective work of this character.

Money statement.

July 1, 1907, balance unexpended		$383,355.37
Amount appropriated by sundry civil act approved May 27, 1908		200,000.00
		583,355.37
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$180,363.37	
For maintenance of improvement	3,942.41	
		184,305.78
July 1, 1908, balance unexpended		399,049.59
July 1, 1908, outstanding liabilities		10,802.02
July 1, 1908, balance available		388,247.57
July 1, 1908, amount covered by uncompleted contracts		65,653.25
Amount (estimated) required for completion of existing project		250,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$250,000.00	
For maintenance of improvement	10,000.00	
		260,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

IMPROVING CUMBERLAND RIVER ABOVE NASHVILLE, TENN., UNDER ORIGINAL PROJECTS FOR OPEN-CHANNEL WORK, FROM 1876 TO 1884.

Geographical division.	Act of—			
	Aug. 14, 1876.	June 18, 1878.	Mar. 3, 1879.	June 14, 1880.
1. Nashville to Kentucky line	$15,000	$20,000	$18,000	$15,000
2. Kentucky line to Smith shoals	10,000	8,000	6,000	10,000
3. Smith shoals	25,000	30,000	15,000	20,000
4. Smith shoals to Falls of Cumberland	2,000	2,000	.....	.....
Total	52,000	60,000	39,000	45,000

Geographical division.	Act of—			Total.
	Mar. 3, 1881.	Aug. 2, 1882.	July 5, 1884.	
1. Nashville to Kentucky line	$15,000	.....	.....	$83,000
2. Kentucky line to Smith shoals	15,000	.....	.....	49,000
3. Smith shoals	10,000	$15,000	.....	115,000
4. Smith shoals to Falls of Cumberland	.....	.....	.....	4,000
5. Above mouth of Jellico, Ky	10,000	5,000	.....	15,000
6. Nashville to Smith shoals	.....	30,000	.....	30,000
7. Nashville to head of Smith shoals	.....	.....	$50,000	50,000
Total	50,000	50,000	50,000	346,000

IMPROVING CUMBERAND RIVER ABOVE NASHVILLE, TENN., UNDER THE PRESENT PROJECT FOR A SYSTEM OF LOCKS AND DAMS FROM NASHVILLE, TENN., TO HEAD OF SMITH SHOALS, MOUTH OF ROCKCASTLE RIVER, KENTUCKY.

Act of—		
August 5, 1886	$75,000.00	
August 11, 1888	200,000.00	
September 19, 1890	250,000.00	
July 13, 1892	250,000.00	
August 18, 1894	200,000.00	
June 3, 1896	20,000.00	
June 4, 1897 (sundry civil act)	350,000.00	
July 1, 1898 (sundry civil act)	250,000.00	
March 3, 1899	100,000.00	
Amended act of June 13, 1902	200,000.00	
Act of—		
March 3, 1905	124,000.00	
June 30, 1906 (sundry civil act)	120,000.00	
March 2, 1907	150,000.00	
March 4, 1907 (sundry civil act)	30,000.00	
May 27, 1908 (sundry civil act)	200,000.00	
		$2,519,000.00

RECEIPTS FROM RECOVERIES, SALES, AND REDEPOSITS.

Amount recovered from failing contractor	$450.17	
Cash deposit taken up, pay due sundry persons uncalled for	2.70	
Cash deposit: Redemption of United States internal-revenue stamps	2.18	
Received on account of sales	20.85	
		475.90
Total		2,519,475.90

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CONTRACTS IN FORCE.

IMPROVING CUMBERLAND RIVER ABOVE NASHVILLE, TENN.

[Formal contracts.]

1. For building concrete Lock and Dam No. 21:
   Total consideration (cement in barrels): $215,658.35.
   Total consideration (cement in sacks): $210,349.26.
   Contractor: Continental Engineering and Contracting Company, of Buffalo, N. Y.
   Date of contract: September 22, 1905.
   Date of approval: October 11, 1905.
   Date of beginning work: October, 1905.
   Date of expiration: December 1, 1907.
   At lock, abutment, etc.: Earth excavation, 48 cents per cubic yard; rock excavation, $2 per cubic yard; embankment, 44 cents per cubic yard; concrete, $5.22 per cubic yard (cement in sacks), $5.45 per cubic yard (cement in barrels); riprap, hand placed, $2.35 per cubic yard; paving, $2.65 per cubic yard; stone filling, $1.94 per cubic yard; puddling, $1.50 per cubic yard; oak timber, $65; pine timber, $60 per thousand feet B. M.; bolt holes, 50 cents per linear foot.
   Dam: Earth excavation, $1.10 per cubic yard; rock excavation, $3.50 per cubic yard; concrete, $7.22 per cubic yard (cement in sacks), $7.45 per cubic yard (cement in barrels).
2. For construction, delivery, and erection of two steel lock gates, filling valves, etc., for Lock No. 21, at $17,900.
   Contractor: Port Huron Shipbuilding Company, of Port Huron, Mich.
   Date of contract: March 9, 1906.
   Date of approval: March 16, 1906.
   Date of beginning work: March, 1906.
   Date of expiration: Forty available working days after completion of masonry necessary for erection.
   (Contract annulled May 19, 1908.)
3. For construction, delivery, and erection of two steel lock gates, filling valves, etc., for each of Locks 3 to 7, at $85,100:
   Contractor: Penn Bridge Company, of Beaver Falls, Pa.
   Date of contract: July 18, 1907.
   Date of approval: July 31, 1907.
   Date of beginning work: July, 1907.
   Date of expiration: October 31, 1909.
4. For furnishing and delivering 1,258,695 feet B. M. yellow pine lumber for Dams 3 and 5, at $25.25 per thousand feet B. M.:
   Contractor: J. K. Joice, of Chicago, Ill.
   Date of contract: December 28, 1907.
   Date of approval: January 7, 1908.
   Date of beginning work: March, 1908.
   Date of expiration: March 15, 1908, for lumber for Dam 5, and May 1, 1908, for lumber for Dam 3. (Time limit waived March 12, 1908.)

COMMERCIAL STATISTICS.

[Open river.]

Cumberland River above Nashville, Tenn., from January 1 to December 31, 1907.

	Tons.		Tons.
Logs	46,105	Staves	45,165
Lumber	12,222	Wood	6,040
Railroad ties	18,810	Spokes	400
Poles and posts	6,654	Handles	1,373
Hoop poles	800	Tobacco	3,330
Headings	469	Grain	13,833

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Cumberland River, above Nashville, Tenn., etc.—Continued.

	Tons.		Tons.
Other farm products	7,674	Coal	35
Iron, manufactured	200	General merchandise	18,433
Sand and gravel	51,788		
Live stock, large	1,400	Total	241,571
Live stock, small	3,340		
Fertilizers	3,500	Estimated value	$9,914,916
		Passengers carried	70,000

(For commerce passing Locks 1 and 2 see commercial statistics, "Operating and care," etc.)

Comparative statement of traffic for seven years.

Calendar year.	Tons.	Calendar year.	Tons.
1901	267,211	1905	382,807
1902	192,270	1906	334,351
1903	304,462	1907	241,571
1904	242,112		

List of steamboats (stern-wheel) plying on the Cumberland River above Nashville, Tenn., calendar year 1907.

Name.	Registered dimensions.			Net tonnage.
	Length.	Breadth.	Depth.	
	Feet.	*Feet.*	*Feet.*	
Albany	120.0	21.0	2.5	52
Ben Hur[a]	49.0	9.0	1.8	.....
Bob Dudley	160.0	29.0	3.8	159
Blue Spot	115.6	23.6	3.7	87
C. M. Pate	111.6	22.4	4.0	82
Castalia	110.0	26.2	3.7	90
Chancy Lamb	136.0	28.8	4.5	194
Charles Turner	104.0	20.3	3.0	73
Cooper[a]	48.0	8.0	1.6	2
Cumberland[a]	64.0	12.0	1.6	11
Dick Clyde	95.8	17.4	3.9	76
Electra	170.0	35.0	5.2	273
H. W. Buttorff	160.0	30.0	4.1	160
Henrietta	130.0	24.0	4.3	153
Henry Harley	160 0	29.0	3.2	162
Herbert	132.8	19.3	3.0	63
Hosmer	95.6	18.4	3.6	52
I. N. Hook	109.9	19.4	3.0	55
Inverness	129.0	21.0	4.8	121
J. B. Richardson	165.0	29.0	4.0	191
J. S.	175.0	33.0	5.3	236
John W. Love	120.0	20.0	4.0	88
Jim T. Duffy, jr	120.0	26.0	3.8	146
Little Ben[a]	45.0	11.0	1.5	5
Little Tip[a]	50.0	16.0	2.5	11
Lora	70.0	12.0	2.5	44.3
Lyda	122.0	24.0	2.4	80
Mackie	120.0	20.6	3.5	77
New Ewall[a]	51.0	10.0	1.6	8
Pavonia	120.0	26.0	4.0	132
R. Dunbar	160.0	29.4	6.4	158
Rowena	140.0	25.0	4.0	97
Sycamore	103.6	20.8	3.0	72
T. L. Herbert	117.0	24.0	3.6	80
W. T. Hunt	60.0	9.8	2.0	10
W. T. Hardison	106.7	21.9	3.9	64
Warrenn	134.3	26.0	4.0	98

[a] Gasoline.

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C C 3.

OPERATING AND CARE OF LOCKS AND DAMS ON CUMBERLAND RIVER.

Besides operating the locks and caring for the buildings and grounds the following work was done:

At Lock A.—Machinery and derricks placed; 150 feet of tram track built; 2,322 cubic yards of sand and gravel unloaded and piled; joints of paving on terreplein filled with mortar; force was organized for repairs to the dam, but high water prevented any effective work; minor repairs made to buildings; lock gates were cleaned and painted, and coal house for lockmaster built.

As soon as stage of water permits, repairs to the dam will be made by placing cement on slope and apron of dam where damage was inflicted by drift caught in the reaction.

At Lock No. 1.—The lock gates were cleaned and painted; outhouse built; porch added to lockman's house, and lockman's house painted.

It is proposed to dredge deposit from chamber and upper approach when the dredge is brought back from the ways at Paducah.

At Lock No. 2.—Mud cleaned from lock chamber by a hired pump boat; filling valves repaired by a submarine diver.

It is proposed to back up the dam and repair the filling valves when the stage of water permits.

ALLOTMENTS.

June 26, 1905	$14,000.00
July 18, 1906	6,014.87
August 13, 1907	28,888.28

Summary of expenditures for operating and care of locks and dams on Cumberland River for fiscal year ending June 30, 1908.

Services	$4,763.52
Repairs	7,037.14
Supplies	925.24
Subsistence	200.27
New hull for derrick boat	1,378.59
Office expenses and contingencies	2,319.19
Total	16,623.95

COMMERCIAL STATISTICS.

Statement of traffic passing locks on Cumberland River during calendar year 1907.

	Lock A.	Lock No. 1.	Lock No. 2.
Total lockages ..... number..	508	868	218
Craft:			
Packets ..... do....	199	200	21
Towboats ..... do....	109	339	82
Government boats ..... do....	15	34	15
Barges ..... do....	274	443	67
Sand dredgers ..... do....	.....	37	1
Small craft ..... do....	201	298	82
Rafts ..... do....	11	162	33

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Statement of traffic passing locks on Cumberland River, etc.—Continued.

		Lock A.	Lock No. 1.	Lock No. 2.
Cargo:				
Logs	tons	677.0	18,663.8	3,047.4
Lumber	do	378.3	456.2	764.4
Railroad ties	do	47,640.8	28,996.0	4,416.6
Poles, telegraph and telephone	do	482.4	6.4	3,867.6
Hoop poles and hoops	do	801.0	239.8	.....
Staves	do	35.0	35.0	.....
Handles and slabs	do	25.4	74.6	116.7
Wood	do	.....	70.0	6.0
Spokes	do	.....	673.0	.....
Wagon felloes	do	.....	.....	12.1
Salt	do	140.0	90.0	90.0
Coal	do	108.0	194.4	4.0
Fertilizers	do	30.0	30.0	.....
Tobacco	do	172.5	158.9	90.0
Grain	do	20,607.6	17,977.5	182.3
Other farm products	do	799.0	808.0	143.0
Sand and gravel	do	1,445.0	9,836.5	1,425.0
Lime and cement	do	8.9	5.7	60.0
Live stock, large	do	294.3	356.9	70.5
Live stock, small	do	208.0	254.2	273.5
Explosives	do	52.0	.....	.....
General merchandise	do	6,016.0	6,259.0	1,334.0
Total		79,416.2	80,180.9	15,408.1
Passengers		2,708	4,965	62

Comparative statement of traffic for three years.

Calendar year.	Lock A.		Lock No. 1.		Lock No. 2.	
	Lockages.	Tons.	Lockages.	Tons.	Lockages.	Tons.
1905	832	89,026.9	813	59,858.2	.....	.....
1906	457	63,445.2	750	56,555.1	.....	.....
1907	508	79,416.2	863	80,180.9	218	15,408.1

C C 4.

IMPROVEMENT OF CANEY FORK RIVER, TENNESSEE.

A quarter boat specially designed for work on this river was built on the Cumberland River and a snagging party organized in June and sent to Franks Ferry, the head of navigation, to begin snagging the river working downstream. Work was begun on June 26. At the close of the fiscal year the following work had been done:

Snags removed		74
Leaning trees cut		82
Trees deadened		36
Rock reefs and boulders removed	cubic yards	135
Distance covered and left clean	miles	15

Money statement.

July 1, 1907, balance unexpended	$2,886.70
June 30, 1908, amount expended during fiscal year, for works of improvement	1,353.01
July 1, 1908, balance unexpended	1,533.69
July 1, 1908, outstanding liabilities	293.50
July 1, 1908, balance available	1,240.19

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APPROPRIATIONS.

June 14, 1880	$6,000	August 11, 1888	$2,500
March 3, 1881	4,000	September 19, 1890	2,500
August 2, 1882	4,000	March 2, 1907	3,000
July 5, 1884	3,000		
August 5, 1886	3,000	Total	28,000

COMMERCIAL STATISTICS.

[From January 1 to December 31, 1907.]

	Tons.
Logs	232
Staves	500
Railroad ties	6,031
Poles	604
Total	7,367
Estimated value	$92,167

The only boat reported as plying on the Caney Fork River during the calendar year was the gasoline boat *Starlight*, 55 feet long, 14 feet wide, and 2 feet deep, with net tonnage of 11.

C C 5.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

Wreck of steamer Bart E. Linehan, in Cumberland River, Nashville, Tenn.—This wreck was removed during the fiscal year. The details may be found on page 1620 of the Annual Report of Chief of Engineers, 1907, and page 560 of the current summary.

Wreck of wharf boat (hull of the steamer Mayflower), in Cumberland River, Nashville, Tenn.—This wreck was removed during the fiscal year. The details may be found on page 1620 of the Annual Report of the Chief of Engineers, 1907, and page 560 of the current summary.

CONTRACT IN FORCE.

For removal of wrecked wharf boat (hull *Mayflower*) in Cumberland River, at Nashville, Tenn.:
Contractor: R. L. Johnson.
Date: October 23, 1906.
Consideration: $700 and material of wreck.
Date of expiration: Sixty favorable working days from date of beginning. (Time limit waived June 18, 1907.)
Date of completion: August 13, 1907.

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APPENDIX D D.

IMPROVEMENT OF RIVERS AND HARBORS IN THE CHATTANOOGA, TENNESSEE, DISTRICT.

REPORT OF MAJ. WM. W. HARTS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Tennessee River.
2. Operating and care of Muscle Shoals Canal, Tennessee River.
3. French Broad and Little Pigeon rivers, Tennessee.
4. Clinch, Hiwassee, and Holston rivers, Tennessee and Virginia.

ENGINEER OFFICE, UNITED STATES ARMY,
Nashville, Tenn., July 23, 1908.

SIR: I have the honor to transmit herewith the annual report for the Chattanooga district for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

WM. W. HARTS,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

D D. 1.

IMPROVEMENT OF TENNESSEE RIVER.

For the purpose of simplifying the record of appropriations the river has been divided into three sections.

(A) ABOVE CHATTANOOGA (188 MILES).

(*a*) *General improvement.*—The work of improvement carried on during the fiscal year was confined to the Caney Creek group of shoals, which are located about halfway between Chattanooga and Knoxville and extend over a stretch of about 8 miles. The several localities, with their distances above Chattanooga, are as follows: Caney Creek shoals, 98 miles; Turner bar, 96.2 miles; Pickels bar, 94.6 miles; Shields dam, 93 miles; Kings bar, 90 miles. Operations for the season of 1907 were begun in June, and at the beginning of the fiscal year 1908 the work of building regulation dams and dredging was in progress.

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The dredge *Kwasind*, with 4 barges and 1 quarter boat, attended by the steamer *McPherson*, was employed in gravel and rock excavation, first at the head of Caney Creek shoals and later at Kings bar until it became evident that the condition of the dredge would not permit of further work. Dredging was therefore discontinued on August 10, and the *Kwasind* was towed to the Muscle Shoals Canal. The work accomplished was as follows (beginning July 1):

Locality.	Gravel.	Loose rock.	Total.
	Cubic yards.	*Cubic yards.*	*Cubic yards.*
Head of Caney Creek shoals	435	370	805
Kings bar	3,048	50	3,098
Total	3,483	420	3,903

An additional 50 cubic yards of loose rock was removed at Kings bar by the derrick boat. The field cost of the work amounted to $2,258.47, indicating an average cost of about 57 cents per cubic yard for excavation.

The building of regulating dams between Turner bar and Pickel bar and at the head of Caney Creek shoals was continued. Two quarries were operated in the course of the season's work for securing rock for dikes, the first near Shields dam while the building of dams was in progress in that vicinity, and the second near the head of Caney Creek shoals while dam construction was being carried on at the upper end of the improvement. The following table shows the extent and cost of the season's quarry operations:

Location of quarry.	Rock quarried.	Total field cost.	Unit cost.
	Cubic yds.		
Shields dam	7,405	$5,280.36	$0.713
Caney Creek shoals	5,630	3,580.90	.636
Total	13,035	8,861.26	.68

The expense of loading and towing the quarried rock and placing it in dams amounted to $4,556.38, making the total field cost of dike construction $13,417.64. The following table exhibits a summary of the work done, with unit costs:

Location of work.	Dikes built.	Unit cost.		
		Quarrying.	Towing and placing.	Total.
	Cubic yds.			
The Rockpile (between Turner and Pickel bars)	8,421	$0.713	$0.279	$0.992
Head of Caney Creek shoals	4,809	.636	.459	1.095
Total	13,230	.680	.345	1.025

The dams built aggregate 5,125 feet in length (3,225 feet at the Rockpile and 1,900 feet at Caney Creek); the average field cost per linear foot amounting to about $2.62, including quarrying, towing, and placing.

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At Caney Creek shoals all the work planned has been carried out except the removal of an old useless dike, the construction of a cross dike, and the completion of the lower end of the main training wall. Results were already very noticeable in more than a foot increase in depth of channel. The completion of the work will give, it is believed, the desired depths.

At Turner and Pickel bars five spurs were nearly or quite completed, but the connecting training wall has not yet been placed, pending observation of the action of the spurs to ascertain whether their lengths are sufficient. At Shields dam a dredged cut was partially made, but was unavoidably left unfinished until the dredge could be strengthened. Part of the training wall was also built for the concentration of the river flow in the selected channel.

The reduction of a rock reef below the Rockpile by subaqueous blasting was also undertaken, but the frequent rises in the river prevented satisfactory progress, and the work had finally to be abandoned on account of the unfavorable conditions. About 100 cubic yards were estimated to have been blasted, but of this only a part had been removed from the channel when operations were discontinued for the season.

In addition some needed work of maintenance was done at the close of the season. An old dam at Long Island, a short distance above Caney Creek shoals, was repaired and extended with about 330 cubic yards of stone towed from the quarry at the latter place. The cost of this work, including the expense of quarrying the rock, was $431.95, or $1.31 per cubic yard in place. The channel banks at the head of Caney Creek shoals and at Long Island were trimmed of overhanging trees and branches. The number of trees cut, over 8 inches in diameter, was 446; under 8 inches diameter, 1,053; trees trimmed, 132; cost of work, $473.95.

Late in November field work was suspended, and preparations were begun for towing the entire fleet to Knoxville for winter quarters and general repairs.

The necessary repair of existing plant and construction of new barges, etc., was undertaken at Knoxville by hired labor early in January, and at the close of the fiscal year the projected work had progressed nearly to completion. Repairs were made to the steamer *Long*, 1 drill tender, 1 derrick boat, 1 launch, 12 barges, 4 quarter boats, 1 commissary and tool boat, and 8 skiffs, at a total cost of $5,757.75. Three new barges and 1 blacksmith-shop boat were built, at a total cost of $3,357.55 for the former and $1,341.20 for the latter. In addition, 1 barge, 2 launch hulls, and 2 launch houses were nearly finished, at a cost of $1,290.71; making the total direct cost of repair and construction of plant at the marine ways in Knoxville $11,747.21.

Extensive boat-building operations were also carried on at the Muscle Shoals Canal in connection with this improvement. The dredge *Kwasind* was entirely rebuilt. In planning this work efforts were made to overcome all the defects which had been apparent in the old boat. The dimensions of the original hull were 22 feet by 70 feet by 6 feet, and the upper works were one story. The new boat is 28 feet by 80 feet by 6 feet 6 inches, with two-story upper works, the upper story being designed to furnish suitable quarters for the crew. Larger engines were installed, a new steel boom was constructed, and the machinery improved and strengthened. The total

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cost of the work, which was begun in February and completed late in May, amounted to $8,991.48. This has resulted in practically a new dredge. Three barges, 100 feet by 24 feet by 4 feet 8 inches, of the framed type, were built at an average cost of $2,103 each. The bottoms and frames are of white oak, the stanchions of yellow poplar, and the sides, bulkheads, and decks of all-heart long-leaf yellow pine. Repairs were made to the steamer *McPherson* and barges Nos. 1, 2, and 3.

A new steam tender, 100 feet by 20 feet by 3 feet, with engine 9 inches by 36 inches, was contracted for, and at the close of the fiscal year had nearly reached completion.

Money statement.

July 1, 1907, balance unexpended		$101,772.88
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$65,739.83	
For maintenance of improvement	983.62	
		66,723.45
July 1, 1908, balance unexpended		35,049.43
July 1, 1908, outstanding liabilities		8,944.67
July 1, 1908, balance available		26,104.76
July 1, 1908, amount covered by uncompleted contracts		10,000.00
Amount (estimated) required for completion of existing project		1,080,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$100,000.00	
For maintenance of improvement	10,000.00	
		110,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

April 10, 1869	$35,000.00	July 13, 1892	$25,000.00
March 3, 1871 (transferred from below Chattanooga)	35,000.00	August 18, 1894	50,000.00
June 10, 1872	25,000.00	June 3, 1896	15,000.00
March 3, 1873	25,000.00	March 3, 1899	30,000.00
June 23, 1874	25,000.00	June 13, 1902	50,000.00
March 3, 1875	40,000.00	March 3, 1905	50,000.00
August 14, 1876	15,000.00	March 2, 1907	105,000.00
June 18, 1878	15,000.00	Total	631,000.00
March 3, 1879	11,500.00	Received from other sources	152.85
June 14, 1880	10,000.00	Total	631,152.85
March 3, 1881	7,000.00	Transferred to Little Tennessee River	2,000.00
August 2, 1882	7,000.00	Total	629,152.85
July 5, 1884	3,000.00		
August 5, 1886	7,500.00		
August 11, 1888	15,000.00		
September 19, 1890	30,000.00		

(*b*) *Little Tennessee River.*—No work was done in the fiscal year except making three inspections involved in causing the removal of masses of rock blasted into the river in the vicinity of Strattons shoals by the contractors for a railway along the banks. The illegal obstruc-

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tions were removed by the contractors when it was learned that steps were being taken to ask that an indictment be presented by the Federal grand jury.

The navigation on this river, outside of timber products, is so insignificant that it seems doubtful whether any further allotments from the appropriation for the upper Tennessee River should be made. The downstream navigation of rafts and flatboats will probably not require any additional improvement for several years, and a further diversion of funds appropriated for the improvement of the main river is not believed to be warranted. For this reason no sum is stated as a profitable expenditure for the fiscal year 1910.

Money statement.

July 1, 1907, balance unexpended	$1,611.68
June 30, 1908, amount expended during fiscal year for maintenance of improvement	121.77
July 1, 1908, balance unexpended	1,489.91

APPROPRIATIONS.

August 2, 1882	$5,000
March 3, 1905, allotment of February 24, 1906	1,000
March 2, 1907, allotment of March 25, 1907	1,000
Total	7,000

ABSTRACT OF CONTRACT IN FORCE.

TENNESSEE RIVER ABOVE CHATTANOOGA AND HIWASSEE RIVER.

Contract with Ed J. Howard, of Jeffersonville, Ind., for construction of two wooden-hull steam tenders.—Contract dated January 28, 1908; approved February 6, 1908. Date of beginning work, February, 1908; date of expiration, July 1, 1908; extended for a reasonable period. Contract price, $10,000 each.

COMMERCIAL STATISTICS.

TENNESSEE RIVER ABOVE CHATTANOOGA, TENN.

1. Freight transported in 1907.

Article.	Quantity.	Estimated value.	Article.	Quantity.	Estimated value.
	Tons.			*Tons.*	
Brick	833	$2,800	Oats	1,605	$67,410
Coal	90,084	225,210	Peas	850	30,600
Corn	15,358	422,345	Produce	351	28,080
Fertilizer	548	10,960	Railroad ties	2,100	8,700
Flour	1,040	52,000	Sand	101,400	33,800
General merchandise	11,240	1,405,000	Straw	750	5,625
Hay	8,915	160,470	Tan bark	4,550	33,125
Iron ore	225,000	337,500	Wheat	3,460	115,300
Live stock	1,646	205,750	Wood	26,575	31,890
Logs	94,450	590,300			
Lumber	5,625	63,925	Total	596,380	3,830,790

Passengers carried, 1,789.

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2. List of commercial vessels operated in 1907.

Name.	Dimensions.			Tonnage.
	Length.	Breadth.	Depth.	
	Feet.	*Feet.*	*Feet.*	
Catherine P. Le	98.5	18.1	3.3	
Grady	130.0	22.0	3.1	
J. L. Dykes	84.7	14.0	3.0	
J. W. Hill	88.0	18.0	3.0	
Jane Austin	112.0	18.5	2.9	
John Ross	121.0	22.0	4.5	
Milnor	90.0	14.6	3.6	
Oliver King	91.0	15.0	2.0	
Sam Davis	118.0	21.0	2.5	
W. T. Gallaher	77.0	14.0	2.5	

Comparative statement of commerce for the past ten years.

Year.	Amount.	Estimated value.	Year.	Amount.	Estimated value.
	Tons.			*Tons.*	
1898	218,378	$2,425,066	1903	552,268	$4,483,220
1899	269,552	2,839,037	1904	562,677	4,473,637
1900	310,697	3,847,629	1905	486,406	6,673,588
1901	291,607	2,604,931	1906	475,515	3,443,920
1902	478,268	4,296,822	1907	596,380	3,880,700

(B) CHATTANOOGA, TENN., TO RIVERTON, ALA. (238 MILES).

1. HALES BAR LOCK AND DAM (33 MILES BELOW CHATTANOOGA).

General plans for the masonry of this lock and dam were completed in August, 1905, and subsequently approved. The Chattanooga and Tennessee River Power Company submitted plans for the power house and other structures on the left bank, and these were approved by the Secretary of War on August 23, 1905. A contract was then made with the power company, under date of September 12, 1905, for the construction of the lock and dam as authorized by the act of Congress approved April 26, 1904, amended (as to location) by act of January 7, 1905, and a contract bond was furnished in the sum of $100,000.

Actual work on clearing the ground was begun October 18, 1905. The power company has purchased and deeded to the United States a tract of about 9.1 acres on the right bank to provide the land necessary for the successful construction and operation of the lock and dam. All structures on the left bank pertain to the power plant, and the land there belongs to the power company.

Since the commencement of operations field work has been carried on continuously, except for a suspension from December 9, 1907, to March 9, 1908, on account of litigation over the failure of the original subcontractor to make proper progress. The principal items of work accomplished during the fiscal year are as follows:

Right bank.—A line of strengthening timber cribs, having a total length of 700 feet and a height of 11 feet, was built inside the steel sheet piling coffer which failed when pumped out last year. These cribs were filled with rock, the space between the cribs and the old steel coffer being filled with earth and gravel taken from the lock pit. The original coffer was later raised to a height of 16 feet above low water. Earth and gravel excavation in the lock pit has been practi-

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cally completed, and rock excavation has been made to grade over 66 per cent of the whole area of the lock, not including the lower approach. A cut-off trench was excavated under the upper sill, across the river buttress, and along the river wall, for a total length of 90 feet. Five cubic yards of concrete were laid in this trench on June 23, being the first concrete placed in the lock. Forms for the lower portions of two blocks at the upper end of the land wall were erected.

Left bank.—A standard-gauge railroad about 3 miles long was constructed from the lock site to Ladd station, on the Nashville, Chattanooga and St. Louis Railway. The necessary excavation for the core wall was made and the wall itself completed, its total length being 706 feet and its contents 10,017 cubic yards. A crib cofferdam was built for a total length of 1,020 feet and to a height of 15.4 feet above low water around the site of the power house and tail race. Earth excavation was continued for the power house and the head and tail races, the material being placed in the earth embankment surrounding the core wall. This excavation is about 60 per cent completed.

The quantities of work done by the contractor up to June 30, 1908, are exhibited in the following table:

Fiscal year.	Earth excavation.	Rock excavation.	Concrete.
	Cubic yds.	*Cubic yds.*	*Cubic yds.*
1906	41,000		
1907	68,162	1,883	5,886
1908	46,942	6,807	4,136
Total	156,104	8,690	10,022

A complete new design for the lower gates was made, and has been approved by the Chief of Engineers. A study of the operating machinery was begun, and some of the necessary field drawings have been made. The metal work to be incorporated in the masonry of the lock has been delivered and stored at the site of the work, and the upper gates are under contract. Plans and specifications have been prepared, and bids are being solicited for the construction and erection of the lower gates.

It has become apparent that the funds available will be insufficient to meet the expenses connected with those portions of the work which by the terms of the act of April 26, 1904, devolve upon the United States.

The original estimate of the total cost of these features was $112,970. This was based on the estimate submitted by Maj. Dan C. Kingman, Corps of Engineers, in his report of January 17, 1900, recommending a lock and dam near Scott Point (Annual Report of the Chief of Engineers for 1900, p. 2957 et seq.). The full amount of the estimate has been appropriated. The expenditures to June 30, 1908, amount to $27,451.54, and the additional sum of $14,400 is pledged for the construction and erection of the upper lock gates, leaving about $72,000 available at the close of the fiscal year 1908.

The project of 1900 contemplated a lock of 27 feet lift, while the works now under construction will necessitate a lift of about 40 feet, the location determined upon being 15½ miles downstream from Scott Point.

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When the present work was projected it was believed that it could be completed in two or three seasons. Although field work has been in progress for over two years, little has been accomplished beyond the completion of the concrete core wall for an embankment to be built on the left bank and the construction of the cofferdam on the right bank. It seems impossible to finish the lock walls in less time than two working seasons, owing to their size, the difficulty of supplying materials, and the arrangement of plant. It does not appear practicable to undertake any work on the construction of the dam until the lock walls have been completed and the gates hung. Owing to the length of this dam, its height, and the difficulty of completing it in the river bed, it is not believed that it can be finished in less time than two working seasons. Allowing further time for the installation of power and the completion of buildings, and adding a margin for delays which are more than likely to occur, it is not deemed advisable to provide for less than five years for the completion of the entire work.

Accordingly, the expenses with which the United States will be chargeable have been estimated as follows:

Inspection and superintendence, sixty months, at $1,312.50 per month		$78,750
1 assistant engineer	$200.00	
1 inspector	137.50	
6 inspectors, at $90	540.00	
2 recorders, at $75 and $60	135.00	
Local office and pro rata share of central office expenses	300.00	
	1,312.50	
Lock houses, office, roads, walks, etc		15,000
Grading, etc		5,000
Lower gates		50,000
Operating machinery for gates and valves		25,000
Total		173,750

The foregoing will be necessary in addition to what has been expended and pledged up to June 30, 1908; and deducting the available balance of approximately $72,000 there remains to be provided $101,750. This sum has therefore been given as the estimated amount required for the completion of the existing project.

Money statement.

July 1, 1907, balance unexpended	$104,061.88
June 30, 1908, amount expended during fiscal year, for works of improvement	18,522.13
July 1, 1908, balance unexpended	85,539.75
July 1, 1908, outstanding liabilities	14.05
July 1, 1908, balance available	85,525.70
July 1, 1908, amount covered by uncompleted contracts	14,400.00
Amount (estimated) required for completion of existing project	101,750.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	50,875.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

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APPROPRIATIONS.[a]

March 3, 1905	$10,000.00
June 30, 1906 (sundry civil act)	40,000.00
March 2, 1907	62,970.00
Total	112,970.00
Receipts from sales of maps	18.29
Total	112,988.29

2. OPEN-CHANNEL WORK.

BETWEEN HOBBS ISLAND AND GUNTERSVILLE (22 MILES).

Late in August the dredge *Kwasind*, which had begun to show too much weakness to continue the heavy digging on which it was engaged in the upper river, had to be taken to the Muscle Shoals Canal shops to be rebuilt. On its way it was ordered to this section to perform some work of a lighter character which was reported to be urgently needed. The necessary plant, consisting of the dredge, the steamer *McPherson*, three scows, and one quarter boat, was assembled at Guntersville on August 31.

Guntersville slough (106 miles below Chattanooga).—Dredging was begun on September 4 and completed on October 31. A channel 100 feet wide was opened to a depth of 6 feet at extreme low water from the railway company's incline to the mouth of the slough. About 23,390 cubic yards of loose material were dredged at this locality, the unit cost averaging 8.7 cents. Fourteen snags were removed in the course of the work.

Allens bar (118 miles below Chattanooga).—After dredging the channel at Guntersville the plant was moved to Allens bar to complete a cut left unfinished for a distance of about 150 yards by the dredge *Kentucky* in May, 1907. This work, which involved the removal of 1,828 cubic yards of sand, gravel, and loose bowlders, was completed on November 4 at an average unit cost of 10.7 cents. The plant was then returned to Muscle Shoals Canal.

Adding the cost of towing the fleet from and to the canal, the expense of inspection and other incidentals, and a reasonable charge for deterioration of plant, the total cost of the work performed at the two localities becomes $2,852.43, giving a unit cost of 11.3 cents for the 25,218 cubic yards of material dredged.

LITTLE MUSCLE SHOALS.

The construction of two reenforced concrete piers above the Twin Towheads, with dams connecting them with the towheads, was practically completed. The piers are designed to afford a safe and convenient means of securing lines when it is necessary for steamboats to warp over the swift water at the head of the islands. The result of the dams has been not only to stop the cross current, but also to decrease the velocity to a considerable extent, so that in many cases boats now make the passage without the use of a line, where formerly it would have been necessary to warp through. The piers, which are provided with ringbolts, have greatly facilitated the laying of

[a] An allotment of $6,000, made June 30, 1904, from the appropriation for examinations, surveys, and contingencies of rivers and harbors, was expended in making preliminary examinations between Scott Point and Hales bar, and is not included in the appropriations for this improvement.

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lines, an operation which hitherto had been difficult and dangerous. The work involved the laying of 115 cubic yards of concrete at a cost of $1,199.43 (or $10.43 per cubic yard), and the building of 106 cubic yards of dike at a cost of $138.52 (or $1.28 per cubic yard).

At a further cost of $615.12 there were removed from the channel banks between Lock 9 and Florence 738 overhanging trees which tended to impede navigation.

The construction and repair of floating plant required for the coming season's work of open-channel regulation was continued at Muscle Shoals Canal.

Money statement.

July 1, 1907, balance unexpended		$206,674.24
Received from sales		24.40
		206,698.64
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$28,474.79	
For maintenance of improvement	1,953.07	
		30,427.86
July 1, 1908, balance unexpended		176,270.78
July 1, 1908, outstanding liabilities		19,695.57
July 1, 1908, balance available		156,575.21
Amount (estimated) required for completion of existing project		1,031,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$200,000.00	
For maintenance of improvement	10,000.00	
		210,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

OPEN-CHANNEL WORK AND MUSCLE SHOALS IMPROVEMENT.[a]

March 2, 1827 (survey)	$200.00	August 18, 1894	$30,000.00
June 9, 1860 (claim)	1,350.00	June 3, 1896	50,000.00
July 25, 1868	85,000.00	March 3, 1899	35,000.00
April 10, 1869	5,095.00	March 23, 1903, allotment from emergency river and harbor act of June 6, 1900	6,000.00
July 11, 1870	45,000.00		
June 10, 1872	50,000.00		
March 3, 1873	100,000.00		
June 23, 1874	100,000.00	June 7, 1904, allotment from emergency appropriation of June 13, 1902	2,853.40
March 3, 1875	360,000.00		
August 14, 1876	255,000.00		
June 18, 1878	300,000.00		
March 3, 1879	210,000.00	March 3, 1905	15,000.00
June 14, 1880	300,000.00	March 2, 1907	205,000.00
March 3, 1881	250,000.00		
August 2, 1882	250,000.00		3,992,998.40
July 5, 1884	350,000.00	Received from other sources	959.48
August 5, 1886	262,500.00		
August 11, 1888	250,000.00	Total	3,993,957.88
September 19, 1890	300,000.00		
July 13, 1892	175,000.00		

[a] The sum of $3,191,726.50 was expended from these appropriations for the Muscle shoals improvement.

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8. COLBERT SHOALS CANAL (8 MILES).

CONTRACT WORK.

Contract with Sheridan-Kirk Contract Company for construction of upper portion of canal.—Under the act of June 13, 1902, authorizing additional contracts for this work to the amount of $600,000, a contract was made in May, 1903, with the Sheridan-Kirk Contract Company for building the upper section of the canal, including the construction of a concrete river wall about 10,500 feet long and the excavation of about 57,000 cubic yards of earth and 143,000 cubic yards of rock from the canal trunk. A contract supplemental to this was entered into December 14, 1903, with the object of extending the lower end of the concrete river wall about 1,500 linear feet, thus completing it to the site of the proposed guard lock, by permitting the substitution of a rock-fill dam, with rubble masonry toe wall for about 5,500 feet of the upper end of the wall. A further supplemental agreement was entered into September 29, 1904, permitting the use of concrete not less than 2 feet thick instead of rubble masonry in the toe wall, which is to be built along the line of the omitted concrete wall, having its top at elevation 34. The rock-fill dam is to rise from this toe wall, with a slope not steeper than 1 on 1¼, to elevation 42, with a top width of not less than 40 feet, measured from inside of toe wall. The extreme low-water elevation in the canal is assumed at 33.5. A third supplemental agreement was made February 23, 1906, authorizing the contractors to use about 5,000 cubic yards of quarry spalls and other refuse stone belonging to the Government at Keller quarry for the purpose of crushing and pulverizing into sand for concrete, at the rate of 25 cents per cubic yard plus any royalty on the stone so used. On account of the high cost of pulverizing this stone, however, its use was discontinued.

Owing to the unfavorable river conditions which prevailed for two or three seasons, the contractors have been granted two extensions of time; the first expiring December 31, 1906, and the second providing for such reasonable length of time as might be required, with vigorous prosecution of the work to complete it.

Work was continued during the fiscal year, except for a suspension, on account of high water and unfavorable weather conditions, from December 16, 1907, to May 25, 1908. In October, 1907, the excavation was completed, except for such small quantities as may be required to obtain a secure foundation for the concrete river wall.

Summary of work performed.

Classification.	Fiscal year 1908.	Total to June 30, 1908.	Condition of work.
	Cubic yds.	*Cubic yds.*	
Rock excavation	2,645	150,917	Practically completed.
Earth excavation	1,271	73,400	Do.
Concrete river wall	10,587	15,165	60 per cent completed.

Length of canal trunk excavated under this contract during the fiscal year, 1,020 feet; total length excavated to June 30, 1908, 6,800 feet. Length of concrete river wall completed during the year, 2,314 feet; partially completed, 420 feet.

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The last cofferdam (1,200 linear feet) required for this work has been finished. For 3,660 linear feet the concrete wall has been carried to the full height of about 19 feet, and for a further distance of 720 feet it has been built to a height of 7 feet below the coping, or to the average height of 11½ feet. The completion of this latter portion and the construction of an additional 1,200 linear feet will finish the section of river wall covered by this contract.

Contract with McGee & Co. for building lower section of the concrete river wall.—Operations were continued under this contract until December 1, 1907, when work was discontinued on account of high water. Since the suspension of work the contractors have failed and the contract has been annulled. It has therefore been necessary to readvertise the work remaining to be done to complete this portion of the wall, involving about 4,000 cubic yards of concrete (together with a few hundred yards of excavation), and two bids therefor were received and opened June 27, 1908. Recommendation has been made that the lower bid, that of the Sheridan-Kirk Contract Company, of Cincinnati, Ohio, be accepted at $1 per cubic yard for earth excavation, $4 per cubic yard for rock excavation, and $10.65 per cubic yard for concrete.

Summary of work performed.

Classification.	Fiscal year 1908.	Total to June 30, 1908.	Condition of work.
	Cubic yds.	*Cubic yds.*	
Rock excavation	.....	2	Indeterminate.
Earth excavation	652	3,858	Nearly completed.
Concrete river wall	3,826	4,794	55 per cent completed.
Backfill	.....	2,412	Completed.

Length of wall built during the year, 670 feet; total length completed to date, 854 feet; length remaining to be completed, 870 feet.

Contracts for excavation of lower section of canal.—The excavation of the lower portion of the canal trunk has been carried on under three different contracts with Shippey & Outzen, of Memphis, Tenn., and one contract with W. A. Shippey and The North Alabama Construction Company, of Riverton, Ala., covering in all stations 10 to 290, involving a total length of about 5 miles and an approximate yardage of 2,020,000. The contractors are working under an extension of time on the two contracts between stations 110 and 260.

Stations 10–110.—This contract began in November, 1905, and work under it was completed October 31, 1907. By the terms of the contract the canal prism was excavated to a bottom width of 112 feet, with side slopes of 1 on 2.

Stations 110–210.—This contract was entered into in 1905, and work began in February, 1906. The contractors were working on this section at the close of the fiscal year. Between stations 198 and 210 the material excavated is being placed in an embankment on the river side of the canal. This embankment will be 1,650 feet long when finished.

Stations 210–260.—This contract was entered into in order to provide for the early undertaking of such additional work as might be practicable with the funds remaining after the completion of the

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contracts between stations 10 and 260. Work was commenced under this contract on March 29, 1908, and is still in progress.

Stations 260–290.—This contract was entered into with the firm of W. A. Shippey and The North Alabama Construction Company on May 8, 1908, and includes all the remaining excavation required for the completion of the canal prism. Work was begun in June and was in progress at the close of the fiscal year.

Summary of work performed.

Contract.	Fiscal year 1908.			Total to June 30, 1908.			Stage of completion.
	Earth.	Hardpan.	Total.	Earth.	Hardpan.	Total.	
	Cubic yds.	*Cubic yds.*	*Cubic yds.*	*Cubic yds.*	*Cubic yds.*	*Cubic yds.*	*Per cent.*
Stations 10–110.....	37,345	28,356	65,701	507,239	67,404	574,643	100
Stations 110–210....	148,522	136,725	285,247	502,614	190,815	693,429	81
Stations 210–260....	89,654	2,200	91,854	89,654	2,200	91,854	32
Stations 260–290....	10,940	.....	10,940	10,940	.....	10,940	8
Total	286,461	167,281	453,742	1,110,447	260,419	1,370,866	68

Length of canal prism completed under excavation contracts during the fiscal year 1908, 7,000 feet; total length practically completed to June 30, 1908, 5.52 miles; total length remaining to be completed, 2.33 miles.

For contract unit prices see "Abstracts of contracts in force," page 1711 of Appendix.

HIRED-LABOR WORK.

The masonry of the lift lock and its approaches at the lower end of the canal, near Riverton, was begun in 1893 and completed in 1900, according to the project then in force. When, however, the abandonment of the proposed guard lock near the upper end of the canal was determined upon by a Board of Engineers in 1905, it was deemed necessary to raise the height of the lock walls 4 feet 10 inches, to provide for use at all stages until the open river can be navigated. Preparations for doing this work by hired labor were commenced in July, 1907, including the installation of derricks and machinery at Keller quarry and at the lock, building cement shed, laying track, etc. All of the old coping, except that on the middle section of the wall, was removed, and such portions of it as were not injured in removal were used again. The coping on the middle section of the wall was cut down 2 inches, and the required width of wall for the new masonry was obtained by placing concrete along the back. The stone already quarried at Keller quarry for the guard lock was utilized. Nearly all of it, however, had to be recut. At the close of the fiscal year the following quantities of work had been accomplished:

	Cubic yards.
Stone cut	596
Masonry laid	1,608
Concrete placed at back of lock walls	180
Coping removed and used again	273

For the purpose of reducing the amount of excavation for the canal prism, the modified project provided for shifting the location toward the river at Boones Branch. It also provided for a toe wall 3 feet wide on top and 15 feet on the base, 9 feet high, and 1,650 feet long, to be built above the mouth of Boones Branch to hold the embankment along the river side of the canal. On account of the high prices submitted for this work when bids were solicited, it was con-

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sidered more economical for the United States to build this wall by hired labor, using the stone at Keller quarry, which had been taken out a number of years ago for the guard lock, now abandoned. The steamer *Colbert*, with 4 barges, was used for towing this stone to the site of the work, and a derrick boat was fitted up by installing a steam hoist and erecting a derrick on the old hull of the dredge *Kwasind*, for use in unloading the stone and placing it in the toe wall. This work was begun on April 25, 1908, and at the close of the year about 1,195 linear feet, or about 70 per cent of the wall, had been completed at a cost of $3,111.28.

Sodding the slopes of the canal above low-water line with Bermuda grass, to prevent erosion, was commenced June 15, 1908, as an experiment. At the end of the month this work had progressed for about 1,300 linear feet.

There remains also to be done by hired labor the paving of the waste weirs and the paving of the embankment at Boones Branch.

Money statement.

July 1, 1907, balance unexpended	$583,520.61
Amount appropriated by sundry civil act approved May 27, 1908	93,000.00
	676,520.61
June 30, 1908, amount expended during fiscal year, for works of improvement	300,359.87
July 1, 1908, balance unexpended	376,160.74
July 1, 1908, outstanding liabilities	37,808.50
July 1, 1908, balance available	338,352.24
July 1, 1908, amount covered by uncompleted contracts	198,276.16
Amount (estimated) required for completion of existing project	759,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	120,000.00

APPROPRIATIONS.

COLBERT AND BEE TREE SHOALS.

September 19, 1890	$150,000.00	March 2, 1907	$200,000.00
July 13, 1892	300,000.00	March 4, 1907 (sundry civil act)	100,000.00
August 14, 1894	245,000.00	May 27, 1908 (sundry civil act)	93,000.00
March 3, 1899	100,000.00		2,088,000.00
June 13, 1902	200,000.00	Received from other sources	16.70
March 3, 1903 (sundry civil act)	350,000.00	Total	2,088,016.70
March 3, 1905	200,000.00		
March 3, 1905 (sundry civil act)	50,000.00		
June 30, 1906 (sundry civil act)	100,000.00		

ABSTRACTS OF CONTRACTS IN FORCE.

LOCK AND DAM AT HALES BAR, TENNESSEE RIVER.

1. Contract with Baltimore Bridge Company, of Baltimore, Md., for furnishing and erecting in place the two leaves forming the upper lock gate, for

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$14,400.—Contract dated March 20, 1907, approved April 19, 1907; original date of expiration, October 29, 1907; extended for a reasonable period.

2. Contract with Atlanta Machine Works, of Atlanta, Ga., for furnishing and delivering certain metal work, for $10,358.—Contract dated March 26, 1907; approved April 29, 1907; completed February, 1908.

COLBERT SHOALS CANAL.

1. Contract with Sheridan-Kirk Contract Company, of Charleston, W. Va., for building section of canal.—Contract dated May 5, 1903, approved May 16, 1903. Supplemental contracts dated December 14, 1903 (approved December 30, 1903), September 26, 1904 (approved October 8, 1904), and February 26, 1906 (approved March 6, 1906). Date of beginning work, June 20, 1903; original date of expiration, September 20, 1905; extended to December 31, 1906, and again for a reasonable period.

Prices: Concrete, $8.28 per cubic yard; earth excavation, 50 cents per cubic yard; rock excavation, $1.98 and $2.33 per cubic yard; iron and steel, 7 cents per pound; laying masonry, $6 per cubic yard; riprap, $2 per cubic yard; stone backing, $10 per cubic yard; stone coping, $24 per cubic yard; face stone, $16 per cubic yard; special stone, $24 per cubic yard; timber, $50 per 1,000 feet B. M.; test holes, 60 cents per linear foot; additional cofferdam required for a portion of the rock-fill dam under supplemental contract, $2.50 per linear foot.

2. Contract with McGee & Co., of Kansas City, Mo., for construction of concrete river wall with foundations for bear-trap sluice.—Contract dated December 11, 1905; approved January 3, 1906. Date of beginning work, May 21, 1906; original date of expiration, December 31, 1906; extended for a reasonable period, but finally annulled on April 22, 1908, on account of failure of contractors.

3, 4, and 5. Contracts with Shippey & Outzen, of Memphis, Tenn., for excavation of canal trunk.—The first, covering stations 10 to 110, dated October 12, 1905, approved November 6, 1905; the second, covering stations 110 to 210, dated October 12, 1905, approved November 6, 1905; the third, covering stations 210 to 260, or as far as available funds will go, dated March 12, 1906, approved March 17, 1906. Date of beginning work, November 21, 1905; original date of expiration, December 31, 1907. Total approximate quantity, 1,800,000 cubic yards; contract unit prices, in each case, 17.49 cents for earth, 50 cents for hardpan, $1 for rock. Contract for stations 10 to 110 completed October 31, 1907; contracts for stations 110 to 210 and 210 to 260 extended for a reasonable period.

6. Contract with W. A. Shippey and the North Alabama Construction Company, of Riverton, Ala., for excavation of canal trunk between stations 260 and 290.—Contract dated April 7, 1908; approved May 8, 1908. Date of beginning work, June 15, 1908; date of expiration, May 12, 1910. Estimated quantity, 350,000 cubic yards; contract price, 24.90 cents per cubic yard (no classification).

COMMERCIAL STATISTICS.

TENNESSEE RIVER BETWEEN CHATTANOOGA, TENN., AND FLORENCE, ALA.

1. Freight transported in 1907.

Article.	Quantity.	Estimated value.	Article.	Quantity.	Estimated value.
	Tons.			*Tons.*	
Beans	1,670	$125,250	Peas	300	$6,000
Brick	555	1,665	Pig iron	1,140	17,100
Coal	17,540	43,850	Potatoes	1,350	27,000
Corn	8,380	232,800	Produce	2,940	235,200
Cotton	9,395	2,348,750	Railroad ties	11,000	52,800
Cotton seed	11,470	481,740	Sand	38,000	17,100
Fertilizer	10,375	207,500	Staves, spokes, etc.	2,100	33,750
Flour	7,031	351,550	Stone	1,128	11,280
General merchandise	89,657	5,080,875	Straw	356	2,670
Hay	2,175	39,150	Tanbark	1,550	10,850
Live stock	2,941	867,625	Tobacco	31	4,340
Logs	61,900	871,400	Wheat	4,700	141,000
Lumber	23,582	267,975	Wood	4,080	6,120
Oats	2,333	46,660			
Peanuts	250	35,000	Total	267,929	10,567,000

Passengers carried, 23,797.

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2. List of commercial vessels operated in 1907.

Name.	Dimensions.			Tonnage.
	Length.	Breadth.	Depth.	
	Feet.	*Feet.*	*Feet.*	
Chastang	116.0	24.0	4.0	77
Chattanooga	175.0	33.0	6.0	300
Columbus[a]	35.0	8.0	3.0	6
Decatur No. 1	108.0	19.6	2.7	48
Guntersville	140.0	28.0	4.0	204
Huntsville	188.2	26.2	3.4	172
J. R. Gunn No. 2	85.0	16.0	3.0	61
Joe Wheeler	155.8	33.5	3.5	181
John A. Patten	167.0	34.5	6.4	259
Julia C[a]	52.3	12.0	2.5	9
Lucille[a]				7
Meteor[a]	58.0	13.0	2.2	14
Pride of Alabama				19
R. L. Westcott	121.0	26.0	4.8	75
Sam Davis	118.0	21.0	2.5	88
South Pittsburgh[a]	40.0	10.0	2.7	8
Speedwell	40.0	10.0	2.5	6
White Oak[a]	90.0	18.0	3.0	30

[a] Gasoline boat.

3. Comparative statement of commerce for the past ten years.

Year.	Amount.	Estimated value.	Year.	Amount.	Estimated value.
	Tons.			*Tons.*	
1898	224,456	$3,578,120	1903	297,851	$7,439,914
1899	253,840	6,118,618	1904	173,406	7,204,092
1900	229,160	5,499,779	1905	175,800	9,475,682
1901	129,160	4,584,322	1906	413,751	10,146,305
1902	137,861	5,567,464	1907	267,929	10,587,080

(c) BELOW RIVERTON, ALA. (226 MILES).

The dredge *Kentucky*, with its attendant plant, reached this section of the river in the latter part of June, 1907, and at the beginning of the fiscal year had nearly finished dredging a channel 1,900 feet long through Petticoat bar (174 miles above Paducah), a locality which had only recently come to be regarded as a serious impediment to navigation. A channel 120 feet wide and 6 feet deep at low water was completed on July 3.

On the 5th of July the plant arrived at Clifton, Tenn., and removed the wreck of a sunken barge lying near the wharf boat at that place.

Double Island (146 miles above Paducah).—At this locality the channel, which is narrow and close to the shore, had become seriously obstructed by the sliding in of a considerable section of the bank, carrying with it a number of large trees. The caving of the bank is due to the deflection of the current by a gravel bar at the head of the island. This slide, trees and all, was removed from the channel on July 10 and 11.

Rockport bar (105 miles above Paducah).—This bar persistently re-forms and requires dredging every year or two. This is accounted for by the peculiar conditions existing at the locality. At the foot of Duck River Island, where the bar forms, the river is about 1,600 feet wide, but on account of its shallowness the section is of comparatively small area. About 1,500 feet below the section contracts to a

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width of about 800 feet, but shows an increased area on account of the greater depth. When the river rises the contracted section gorges and an eddy is formed at the foot of the island. From the mouth of Duck River, about 3 miles above, there is a strong, uniform current, and the silt brought down by this tributary is carried along until it reaches the slack water at the foot of the island, where it is deposited.

The dredge arrived here on July 13, and after a minor survey had been made it was decided, as an experiment, to open a channel directly through the bar at the foot of the island, instead of parallel to it or obliquely across to the right shore, as had been done on previous occasions. Five cuts were made in this direction, opening a channel 200 feet wide and 6 feet deep at extreme low water. This work involved the removal of 37,700 cubic yards of loose gravel and was completed on July 29.

Johnsonville (96 miles above Paducah).—The river at this place is spanned by a railroad bridge, the draw span of which is situated near the left bank. The contraction of the cross section of the river, due to the presence of the bridge piers and the revetment around them, has caused considerable scour between and immediately below the piers, and the material thus removed by the current has been deposited a short distance downstream, forming several bars, the largest of which had seriously narrowed the channel used by towboats. Two cuts from the side of this bar were made, adding about 80 feet to the channel width. The material excavated consisted of about 9,200 cubic yards of gravel.

The channel used by packet boats in crossing the river to the elevator had been encroached upon by a similar bar. About 13,000 cubic yards of gravel were dredged from the foot of this bar and from the vicinity of the landing at the elevator. This improvement was completed on August 11.

Danville (78 miles above Paducah).—The Louisville and Nashville Railroad crosses the river at this point and all river freight received and distributed here is handled by means of an incline and a wharf boat. The incline enters the river in an upstream direction, and owing to the sediment deposited in the eddy water on the lower side the approach to it had become impassable at low stages. About 15,200 cubic yards of gravel and mud were excavated at the incline and alongside the wharf boat, thus affording a 6-foot depth at low water.

Head of Three-Mile Island (27 miles above Paducah).—The dredge arrived here on August 24. At this locality the river is divided by Three-Mile Island and Twenty-seven-Mile Island into three chutes, the left-bank chute being the steamboat channel. This channel was obstructed for a distance of 3,800 feet by a bar from the head of Three-Mile Island, which had been giving much trouble both to packets and to towboats. An examination made on the arrival of the fleet showed it to be then the shallowest place on the river below Hamburg. Four cuts were made through the entire distance obstructed, opening a channel 160 feet wide and 6 feet deep at extreme low water. The dredged material from the upper portion, consisting of a very hard, cemented gravel, was deposited in the two unused chutes in order to throw more water into the channel. The remainder of the material, principally loose gravel, was deposited along the shore of Three-Mile Island opposite the lower portion

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of the dredged channel, with a view to compensating for the increased sectional area caused by the improvement. The total excavation made amounted to about 35,900 cubic yards of cemented gravel and 63,800 cubic yards of loose gravel. This work was completed on November 8.

On the 9th the plant was moved to Gilbertsville, Ky., complaint having been made of an obstruction under the draw span of the Illinois Central Railroad bridge. Three piles were found which had been cut off at about 3 feet below the low-water surface. These were removed, and on the 10th the crew was partially disbanded and the work of towing the plant to Muscle Shoals Canal begun.

Summary of work performed.

Classification.	Quantity excavated.	Unit cost.
	Cubic yards.	*Cents.*
Loose gravel and soft material	141,300	4.6
Cemented gravel	35,900	13.0
Total	177,200	6.2

In addition several slides were removed from the channel, and about 60 obstructing snags and fallen trees, including those borne in by the slides, were taken out.

The season was favorable for work, and the improvements made have already been of great value in permitting deeper loading and easier navigation. The results have been very satisfactory. Investigation shows that but little shoaling has taken place anywhere in the new cuts, although some was expected, especially at Rockport bar, which, however, has remained practically as when finished.

At the Muscle Shoals Canal shipyard the dredge *Kentucky* was rebuilt, a new hull being constructed nearly on the lines of the original boat, though some changes were made with a view to securing greater strength of design. The cost of the work, which had been practically though not quite completed at the close of the fiscal year, will amount to about $12,000. The old hull will be utilized by converting it into a derrick boat. A new towing scow, 50 feet by 24 feet by 4 feet 8 inches, and a quarterboat 100 feet by 20 feet by 3 feet 6 inches, with double deck, were also built for the dredge fleet at a cost of $1,198.59 for the former and of $2,745.61 for the latter. The steamer *Lookout* was given general repairs, the cost of which amounted to $1,468.03.

Money statement.

July 1, 1907, balance unexpended		$40,358.75
Collected for damages to dredge *Kentucky*		250.00
		40,608.75
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$9,058.80	
For maintenance of improvement	27,176.42	
		36,235.22
July 1, 1908, balance unexpended		4,373.53
July 1, 1908, outstanding liabilities		8.65
July 1, 1908, balance available		4,364.88

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Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$40,000.00	
For maintenance of improvement	10,000.00	
		$50,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

TENNESSEE RIVER BELOW RIVERTON, ALA.

September 19, 1890	$25,000.00
July 13, 1892	25,000.00
August 18, 1894	125,000.00
March 3, 1899	100,000.00
June 13, 1902	19,000.00
June 7, 1904, allotment from emergency appropriation, act of June 13, 1902	3,497.74
March 3, 1905	30,000.00
March 3, 1906, allotment from emergency appropriation, act of March 3, 1905	4,700.00
March 2, 1907	40,000.00
	372,197.74
Received from other sources	325.79
Total	372,523.53

COMMERCIAL STATISTICS.

TENNESSEE RIVER BETWEEN FLORENCE, ALA., AND PADUCAH, KY.

1. Freight transported in 1907.

Articles.	Quantity.	Estimated value.	Articles.	Quantity.	Estimated value.
	Tons.			*Tons.*	
Beans	1,670	$125,250	Lumber	46,136	$524,275
Brick	915	2,590	Oats	1,015	42,630
Cement	3,320	44,820	Peanuts	3,351	536,160
Coal	1,832	4,580	Potatoes	1,350	27,000
Corn	6,350	177,800	Produce	490	36,750
Cotton	4,766	1,191,500	Railroad ties	414,752	1,824,910
Cotton seed	1,965	82,530	Salt	2,125	17,000
Fertilizer	1,850	46,250	Staves, spokes, etc	19,440	340,200
Flour	6,250	312,250	Telegraph poles	22,245	185,375
General merchandise	25,750	3,862,500	Tobacco	400	56,000
Hay	790	14,220	Wheat	3,096	103,200
Live stock	7,750	930,000			
Logs	65,469	436,460	Total	643,077	10,921,250

Passengers carried, 25,810.

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2. List of commercial vessels operated in 1907.

Name.	Dimensions.			Tonnage.
	Length.	Breadth.	Depth.	
	Feet.	*Feet.*	*Feet.*	
American	142.5	28.9	4.7	188
Anna H[a]				3
Blue Spot	115.6	23.6	3.7	87
Castalia	110.0	26.2	3.7	90
Charles Turner	104.0	20.0	3.0	73
Chattanooga	175.0	33.0	5.0	300
City of Charleston	107.9	23.3	3.0	92
City of Saltillo	200.0	37.0	6.6	572
City of Savannah	230 0	36.0	6.0	528
Clyde	175.0	33.0	5.2	335
E. Douglas	112.0	24.0	4.0	98
Henrietta	130.0	24.0	4.3	99
I N. Hook	109.9	19.4	3.0	55
Inverness	129.0	21.0	4.8	121
J. T. Reeder	98.0	19.0	3.0	54
Jim T. Duffy, jr	120.0	26.0	3.8	146
Joe Wheeler	155.8	33.5	3.5	132
Kentucky	176.0	33.0	5.0	301
Kuttawa	58.0	10.0	2.5	12
Lyda	122.0	24.0	2.4	89
Margaret	142.0	26.0	4.6	201
Martha H. Hennen	112.0	23.0	4.8	77
Mary A. Anderson	100.0	27.0	3.0	71
Mary M. Michael	143.3	26.3	4.4	224
Nellie	80.0	16.0	3.2	30
Nellie Willett	102.0	27.5	3.5	98
Noxall[a]				
Pavonia	126.0	26.0	4.0	132
Russell Lord	160.0	30.0	5.0	195
Saturn[a]	40.0	10.0	3.0	9
Shiloh	150 0	28.0	4.0	140
Vincennes	98.5	20.0	3.3	51
Wilford	85.0	18.8	3.0	47

[a] Gasoline boat.

3. Comparative statement of commerce for the past ten years.

Year.	Amount.	Estimated value.	Year.	Amount.	Estimated value
	Tons.			*Tons.*	
1898	602,916	$8,388,954	1903	848,758	$8,720,25
1899	462,307	5,592,720	1904	871,380	18,325,00
1900	1,237,009	6,105,127	1905	663,606	11,091,97
1901	658,102	6,322,450	1906	766,118	10,930,00
1902	1,056,270	15,370,604	1907	643,077	10,921,25

D D 2.

OPERATING AND CARE OF MUSCLE SHOALS CANAL, TENNESSEE RIVER.

The canal was operated and the locks, canal trunk and embankments, railway, buildings and grounds, and floating plant were cared for during the year.

LOCKS.

Preparations were made for lining the quoins at the lower gates of each lock with cast-iron plates, to arrest leakages, and for replacing the wooden drop-gate frames at Locks 5, 6, and 8 with concrete-steel frames; but owing to the pressure of other work at the canal these and other projected repairs had to be deferred. The usual

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operations of maintenance were carried on, such as cleaning and painting gates, making minor repairs to the various appurtenances of the locks, removing drift from valves, etc.

CANAL TRUNK AND EMBANKMENTS.

Accumulations of drift along the lateral dam above Lock A were removed from time to time, piled and burned. The Parker drift-sluice gate refused to operate and was repaired at a cost of $340.52, the work requiring the construction of a cofferdam. It now appears probable that the structure will have to be rebuilt, including the foundations and side walls. Leaks were stopped at several places in the embankment.

The bucket-chain dredge *Alabama*, which is operated exclusively in the maintenance of depths in the canal pools and entrances, continued dredging above Lock A (Elk River division) until October, removing 35,824 cubic yards of deposited material from that section of the canal trunk. Later it was employed at the lower (Muscle Shoals) division at various places down to Lock 6, but principally in the entrance to Lock 1. Altogether the material removed amounted to about 59,372 cubic yards, the cost of the work averaging about 5.6 cents per cubic yard, including repairs to the dredge and all other incidental expenses. The field cost per cubic yard dredged was about 3.4 cents.

RAILWAY.

The roadbed was kept surfaced and repaired. During the year 4,085 new cross-ties were placed in the track. New bridges were built across the log chute and sawmill headrace, and new platforms in front of the sawmill and property house. All the bridges along the line, except those at Bluewater and Shoal creeks, were provided with guard rails and repaired with new cross-ties. The total expenses in connection with maintenance of way amounted to $5,550.35, or an average of about $347 per mile for the 16 miles of track.

Each piece of rolling stock underwent repairs during the fiscal year, mainly, however, of a minor character. The locomotives were operated for a total distance of 17,014 miles, at a cost of about 12.2 cents per engine mile.

BUILDINGS AND GROUNDS.

One new building, a two-story shed at the dry dock (the lower floor to serve as a workroom in rainy weather and the upper floor as a storeroom), was added to the list, making a total of 41, exclusive of small outbuildings. Nearly all of the buildings were repaired or painted. Concrete walks around the lockmen's houses at Locks 3, 4, and 5 were built. Roads, fences, and grounds were repaired and improved.

SHOPS.

Sawmill and carpenter shop.—Under authority granted in the preceding fiscal year, as mentioned in the last annual report, the worn-out circular-saw mill was replaced with a new 6-foot band mill. The need for large quantities of lumber for building floating plant having become very urgent, some changes were made involving

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greater expense than was at first contemplated, in order that the mill might be operated to its fullest capacity. Instead of repairing the old timber headrace and flume, a new concrete-steel race and steel flume were put in. The new headrace was built larger, in order to supply all the water required for the full development of the present turbine. The new race has the additional advantage of leading straight from the canal to the flume, whereas the old one made a right-angle bend.

After the mill had been placed in operation the need for other improvements developed. The old device for pulling logs into the mill was found insufficient, and a new apparatus, which has developed several times the speed and capacity of the old one, was built from parts of an old hoisting engine taken from the scrap pile. It was also seen that a log turner would assist in increasing the output of the mill and facilitate its operation. The scrap pile was again drawn upon, and a drum-and-chain turner made that has proved entirely satisfactory. It was found that in cutting certain kinds of timber, notably pine and gum, a jet of water must be played on the saw to keep it free from gum; and accordingly a small belt-driven pump was installed for the purpose. The mill had not been long in operation before it became necessary to make arrangements for the repairing and sharpening of the saws at the mill. A complete equipment was therefore purchased and installed in an adjacent room.

While the output of the new mill is not more than double that of the old one, the work of sawing can be carried on much more steadily and a great saving is effected on account of the diminished kerf. A further important advantage gained is in the quality of the lumber manufactured, as the new mill cuts very uniformly to the line, leaving a minimum to be dressed off with the planer.

The logs purchased during the year aggregated 1,199,048 feet B. M. These were bought delivered at the bank of the river, or else the timber was purchased on the stump (at prices ranging from $7.50 to $12 per thousand) and cut and hauled by hired labor or by contract. The logs cost, on an average, delivered on the bank of the river, $18.41 per 1,000 feet B. M. Adding the expense of loading on barges, towing to Lock 6, and unloading, the total cost delivered at the mill averaged $20.89 per thousand.

The lumber sawed during the year amounted to 1,023,960 feet B. M., the average unit cost of which is arrived at as follows:

	Per 1,000 feet B. M.
Wages and subsistence of operatives	$3.17
Repairing and filing saws	.58
Stacking lumber, or transferring where needed	1.26
Cost of logs delivered at mill	20.89
Add for miscellaneous expenses, inspection, etc	1.10
Total cost of rough lumber	27.00

The total quantity planed was 645,342 feet, the average cost of this work being $1.80 per thousand. The average unit cost of lumber sawed, planed, and delivered thus becomes $28.80.

Purchased in open market the cost of this material would have been not less than $35 per thousand. In addition to this substantial

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saving in cost, important incidental advantages are secured. The greater part of the lumber manufactured was from 24 to 46 feet in length and could not have been furnished by local mills; while if bought at a distance the attendant delays and necessary cutting would have been troublesome and expensive. It is plain that facilities for manufacturing lumber to order and without delay must afford an invaluable aid in the rapid and economical prosecution of boat-building operations, which constituted the most extensive feature of the work carried on at the canal during the year.

Since nearly all of the floating plant built or repaired at the canal pertained to other appropriations, only a small portion of the expenditures in connection with the procurement of logs and the operation of the sawmill and planing mill was borne by the canal allotment.

Machine shop, blacksmith shop, and foundry.—The operations carried on during the year were principally in connection with repair and construction work under the various appropriations for general improvement in the district, as, for example, the construction of the metal parts of the bear-trap drift sluice for Colbert Shoals Canal.

In the iron foundry 306 castings, aggregating 36,118 pounds in weight, were made at an average cost per pound of about 1¾ cents for labor and material. There were also made 88 brass castings, weighing 581.5 pounds, at an average cost of 30 cents per pound.

FLOATING PLANT.

Steamer W. R. King.—Minor repairs were made from time to time during the year, and in June the boat was docked preparatory to a general overhauling. The *King* was operated for a total distance of 2,341 miles, at an average cost of about 52 cents per mile. The total expenditures for operation and care of this boat were $2,122.98, of which the sum of $387.74 was borne by the Colbert Shoals Canal work.

Derrick boat No. 3.—Repairs were made to sides and bottom, spud casings, and machinery, and the hull was painted.

Dredge Alabama.—General repairs were made at an aggregate cost of $1,138.97.

The rest of the floating plant belonging to the canal, including the steamer *Colbert*, was engaged on other works in the district, and all repairs made were accordingly charged to the appropriations for those works.

The construction of plant was undertaken on so large a scale as to necessitate a considerable extension of the working space available at the shipyard. The north bank of the dry dock was graded back for a space of about 30 feet and for the full length of the dock. In addition a tract of about 2 acres of land, facing about 700 feet on the canal just below the dock premises, was leased for one year. The boat-building operations carried on were mainly for the works in progress under other appropriations, the most important items of work accomplished being the construction of new hulls for the dredges *Kwasind* and *Kentucky*, 3 barges, 2 quarter boats, and 1

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towing scow. General repairs were made to the steamer *Lookout*, and the construction of 235 scale boards for handling stone was nearly completed.

ALLOTMENTS.

November 28, 1890	$40,000.00	July 1, 1902	$60,529.19
July 1, 1891	31,792.04	August 7, 1902 (to rebuild hull of dredge)	8,000.00
July 1, 1892	45,232.90	November 6, 1902 (to purchase land)	1,200.00
July 1, 1893	60,975.19	July 1, 1903	61,016.78
July 1, 1894	63,772.63	May 23, 1904 (to purchase land)	605.00
July 1, 1895	64,793.11	July 1, 1904	61,920.78
July 1, 1896	62,707.46	July 1, 1905	47,391.46
July 1, 1897	67,979.55	July 1, 1906	44,063.92
July 1, 1898	62,868.17	June 14, 1907 (to cover deficiency)	6,000.00
July 1, 1899	59,239.20	July 1, 1907	64,192.51
July 1, 1900	63,000.00		
July 20, 1900 (to cover deficiency)	355.95	Total	1,075,066.49
November 2, 1900 (to repair dam above Lock A)	4,500.00		
July 1, 1901	62,950.65		
April 12, 1902 (to repair storm damage)	30,000.00		

Summary of expenditures for operating and care of Muscle Shoals Canal for the fiscal year ending June 30, 1908.

Office and administration	$5,958.50
Maintenance and operation of locks	11,399.84
Maintenance of canal trunk and embankment	12,463.28
Maintenance and operation of railway	9,620.79
Maintenance of buildings and grounds	9,004.67
Maintenance of floating plant	4,010.26
Miscellaneous expenses and contingencies	10,504.14
Total	62,961.48

COMMERCIAL STATISTICS.

MUSCLE SHOALS CANAL, ALABAMA.

1. Freight transported through canal in 1907.

Articles.	Quantity.	Estimated value.	Articles.	Quantity.	Estimated value.
	Tons.			*Tons.*	
Beans	267	$20,025	Live stock	43	$5,375
Corn	626	15,650	Logs	1,327	7,962
Cotton	1,794	448,500	Lumber	1,027	12,324
Cotton seed	1,321	52,840	Railroad ties	7,268	29,072
Farm implements	79	11,850	Staves	2,187	34,992
Farm produce	525	39,375	Tobacco	10	1,400
Fertilizer	1,030	25,750	Wood	690	1,380
Flour	133	6,650			
General merchandise	2,773	316,625	Total	21,100	1,069,770

Number of passengers carried, 845.

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2. List of vessels using canal in 1907.

Name.	Net tonnage.	Number of trips made.	Total trips of barges.	Total tonnage of barges.
Almande	73	18	5	815
Chattanooga	390	31	.....	.....
City of Charleston	92	15	5	810
Columbus	6	11	11	750
Decatur No. 1	48	90	102	17,450
J. R. Gunn No. 2	61	32	26	3,085
J. T. Reeder	54	12	.....	.....
Joe Wheeler	198	24	.....	.....
Meteor	14	47	25	4,240
Pride of Alabama	19	46	34	1,710
White Oak	80	22	32	2,135

Number of lockages made, not including those of Government craft, 1,934.

3. Comparative statement of commerce for the past ten years.

Year.	Amount.	Estimated value.	Year.	Amount.	Estimated value.
	Tons.			*Tons.*	
1898	10,264	$284,081	1903	10,571	$712,150
1899	14,319	296,003	1904	10,560	559,002
1900	14,881	297,894	1905	17,796	759,100
1901	11,925	592,634	1906	26,878	1,074,945
1902	7,712	577,505	1907	21,100	1,059,770

D D 3.

IMPROVEMENT OF FRENCH BROAD AND LITTLE PIGEON RIVERS, TENNESSEE.

A small working party was organized late in September for the purpose of performing certain needed work of maintenance. Operations were commenced at Zimmermans ford, about 36 miles from the mouth, where the main regulation dike was repaired in a number of places. The channel over the bar was deepened by means of teams and scrapers, and much of the gravel thus removed was utilized to calk and strengthen the dam. It is estimated that an increase of 1½ feet in navigable depth was obtained at this locality. The cost of the work amounted to $522.

At the "Hay Shed," a bar about 1 mile below Zimmermans ford, about 200 cubic yards of bowlders were removed from the channel, giving an added depth of about 1 foot. At Saffels shoals the most obstructive bowlders were removed, and at the mouth of Pigeon River three large trees which blocked the entrance of this stream were taken out. At the "Gallops," 23 miles from the mouth, a decided increase in channel depth was obtained by the removal of about 50 cubic yards of rock.

Late in October it became necessary to discontinue work, owing to the unfavorable weather conditions. The field expenditures amounted in all to $646.51.

It is believed that this stream is of sufficient commercial importance to warrant a biennial appropriation of $10,000 for maintenance of the navigable waterway by the removal of minor channel obstruc-

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tions and the repair of works of regulation, so as to facilitate the passage of boats at low stages of the river. This amount will probably be necessary for several years.

In the money statement the amount that can be profitably expended in the extension of the improvements on this river during the fiscal year of 1910 is given as $18,000. This is in addition to the amount required for maintenance. Should these funds become available for an extension of the work under the project it is proposed to apply them to the improvement of the shoals in the river below Dandridge, more particularly to Saffels, Seven Island, and Hanging Rock shoals and to the group of obstructions known as Evans Island shoals, embracing Douglas, Zimmerman, and Harrison Island shoals. This amount is asked for, as more economical and effective work can be done than when appropriations are too small.

Money statement.

July 1, 1907, balance unexpended	$4,027.79
June 30, 1908, amount expended during fiscal year for maintenance of improvement	850.27
July 1, 1908, balance unexpended	3,177.52
July 1, 1908, outstanding liabilities	126.19
July 1, 1908, balance available	3,051.33
Amount (estimated) required for completion of existing project	61,515.64
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$18,000.00
For maintenance of improvement	10,000.00
	28,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS FOR FRENCH BROAD RIVER, NORTH CAROLINA.

August 14, 1876	$10,000.00	March 3, 1881	$5,000.00
June 18, 1878	15,000.00	August 2, 1882	5,000.00
March 3, 1879	5,000.00		
June 14, 1880	3,000.00	Total	43,000.00

APPROPRIATIONS FOR FRENCH BROAD RIVER, TENNESSEE.

June 14, 1880	$10,000.00	June 13, 1902	$15,000.00
March 3, 1881	3,500.00	March 3, 1905	2,000.00
August 2, 1882	5,000.00	March 2, 1907	2,000.00
July 5, 1884	3,500.00		
August 5, 1886	6,000.00		99,000.00
August 11, 1888	10,000.00	Receipts from sales	501.96
September 19, 1890	10,000.00		
July 13, 1892	15,000.00	Total	99,501.96
August 18, 1894	7,000.00		
June 3, 1896	5,000.00	Grand total	142,501.96
March 3, 1899	5,000.00		

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COMMERCIAL STATISTICS.

FRENCH BROAD RIVER, TENNESSEE.

Freight transported in 1907.

Articles.	Quantity.	Estimated value.	Articles.	Quantity.	Estimated value.
	Tons.			*Tons.*	
Corn	2,800	$63,000	Lumber	3,630	$43,560
Farm produce	66	4,950	Marble	2,350	29,375
Fertilizer	223	4,460	Pease	130	2,600
General merchandise	1,568	235,200	Sand	65,000	89,000
Hay	1,504	24,064	Straw	278	2,780
Live stock	740	92,500			
Logs	4,380	26,280	Total	82,669	567,769

Passengers carried, 249.

The steamboats engaged in this traffic were the *Catherine P. Le, J. W. Hill, Jane Austin, Milnor,* and *Oliver King.* Their dimensions and tonnage have been reported in the commercial statistics for the Tennessee River above Chattanooga.

Comparative statement of commerce for the past ten years.

Year.	Amount.	Estimated value.	Year.	Amount.	Estimated value.
	Tons.			*Tons.*	
1898	124,960	$928,361	1903	102,076	$1,089,453
1899	102,263	779,705	1904	258,847	2,129,246
1900	160,827	1,225,677	1905	188,700	1,599,587
1901	103,340	922,032	1906	139,157	976,424
1902	157,819	1,810,772	1907	82,669	567,769

D D 4.

IMPROVEMENT OF CLINCH, HIWASSEE, AND HOLSTON RIVERS, TENNESSEE.

(A) CLINCH RIVER.

In July a small working party was organized at Clinton, Tenn., about 60 miles from the mouth, for the purpose of going over the river and removing any minor channel obstructions noted on the way, with a view to assisting raft navigation. The necessary boats, viz, a quarter boat 12 by 36 feet, a kitchen barge 10 by 24 feet, and a light bateau, were built by hired labor at a cost of $200. The party left Clinton on August 5 and reached the Tennessee River on September 20. The items of work accomplished were as follows:

Snags removed		244
Overhanging trees cut		374
Loose material removed	cubic yards	105
Solid rock blasted and removed	do	56
Rock placed in existing dikes	do	138

The total cost of the work, including the construction of boats, inspection, and incidental expenses, was $972.38.

The tonnage of this river consists principally of logs, which are floated down the river in rafts at high-water stages; whereas the remainder is almost all transported between Kingston and the Tennessee River, a distance of about eight-tenths of a mile. In view of

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the slight use made of this stream above Kingston, it does not appear desirable to expend any money upon it until the time arrives for some radical improvement. For this reason it is recommended that appropriations for this stream be suspended for the present. Kingston is properly a Tennessee River port, and the portion of the river in use by steamboats can be improved better in connection with the Tennessee River work.

Money statement.

July 1, 1907, balance unexpended	$1,500.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	972.38
July 1, 1908, balance unexpended	527.62
July 1, 1908, outstanding liabilities	28.84
July 1, 1908, balance available	498.78

APPROPRIATIONS.

June 14, 1880	$10,000.00	March 3, 1905 (allotment dated April 10, 1905)	$1,500.00
March 3, 1881	3,000.00	March 2, 1907 (allotment dated March 25, 1907)	325.43
August 2, 1882	3,000.00		54,825.43
July 5, 1884	5,000.00	Receipts from sales	1.10
August 5, 1886	5,000.00	Total	54,826.53
August 11, 1888	5,000.00		
September 19, 1890	4,000.00		
July 13, 1892	4,000.00		
August 18, 1894	2,500.00		
March 3, 1899	8,500.00		
June 13, 1902 (allotment dated July 5, 1902)	3,000.00		

COMMERCIAL STATISTICS.

Freight transported in 1907.

Articles.	Quantity.	Estimated value.	Articles.	Quantity.	Estimated value.
	Tons.			*Tons.*	
Brick	300	$850	Produce	338	$25,350
Corn	4,064	81,280	Railroad ties	2,091	9,200
Flour	482	24,100	Salt	250	1,000
General merchandise	8,370	627,750	Straw	387	3,870
Hay	685	10,960	Tan bark	450	2,150
Live stock	2,000	250,800	Wheat	1,650	55,000
Logs	68,928	341,640	Wood	800	1,200
Lumber	560	7,000	Total	94,655	1,562,950
Oats	2,130	85,200			
Peas	1,080	21,600			

Passengers carried, 760.

With the exception of the logs, which were practically all rafted, and about 400 tons of farm products transported between Harriman, on the Emory River and Tennessee River points (4.5 miles on Clinch River), the above traffic was carried only about 0.8 of a mile on the Clinch; i. e., between Kingston and the mouth.

The steamboats engaged in this commerce were the *N. B. Forrest*, which maintains a regular service between Chattanooga and Kingston during the greater

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part of the year, and the *W. T. Gallaher*. The dimensions and tonnage of these boats appear in the commercial statistics for the Tennessee River above Chattanooga.

Comparative statement of commerce for the past ten years.

Year.	Amount.	Estimated value.	Year.	Amount.	Estimated value.
	Tons.			*Tons.*	
1898	160,315	$865,759	1903	161,716	$2,847,372
1899	185,691	2,391,624	1904	109,701	1,930,686
1900	132,511	1,462,294	1905	126,800	4,733,308
1901	164,586	1,633,103	1906	112,284	2,161,130
1902	129,925	2,272,348	1907	94,655	1,522,960

(B) HIWASSEE RIVER.

After the suspension of field work in June, 1907, no floating plant was available for this improvement, and work was not resumed until June 11, 1908, when the rebuilt dredge *Kwasind*, attended by the steamer *McPherson*, began operations at Blackbird shoals (17 miles from the mouth). At the close of the fiscal year about 9,780 cubic yards of gravel had been dredged at this locality, at a cost of $594.03, or 7.4 cents per cubic yard, and preparations for commencing dike construction were in progress.

A new steam tender for use in connection with the improvement of this river has been nearly completed under contract. (See "Abstract of Contract in Force," page 1701 of Appendix.) A new quarter boat, 105 feet by 21 feet by 3 feet, was built at the Government shipyard at Muscle Shoals Canal, at a cost of $3,257.38. The boat is provided with a kitchen, dining room, and office, and has quarters for 36 men.

The new works of improvement now being built on this river should be maintained by regular appropriations until their condition has become permanent. Occasional dredging should be done and the dikes kept in repair. A biennial appropriation of $10,000 should be available for the next few years for this purpose.

Money statement.

July 1, 1907, balance unexpended	$49,803.24
June 30, 1908, amount expended during fiscal year, for works of improvement	10,539.29
July 1, 1908, balance unexpended	39,263.95
July 1, 1908, outstanding liabilities	5,608.30
July 1, 1908, balance available	33,655.65
July 1, 1908, amount covered by uncompleted contracts	10,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

August 14, 1876	$10,000.00	March 3, 1905 (allotment dated April 10, 1905)	$4,500.00
June 13, 1878	10,000.00	March 2, 1907 (allotment dated March 25, 1907)	55,282.40
March 3, 1879	3,000.00		106,282.40
June 14, 1880	3,000.00	Receipts from sales	8.23
March 3, 1881	1,500.00	Total	106,290.63
August 2, 1882	1,500.00		
July 5, 1884	2,500.00		
August 15, 1886	2,500.00		
August 11, 1888	1,000.00		
September 19, 1890	1,500.00		
June 13, 1902 (allotment dated July 5, 1902)	10,000.00		

COMMERCIAL STATISTICS.

Freight transported in 1907.

Articles.	Quantity.	Estimated value.	Articles.	Quantity.	Estimated value.
	Tons.			*Tons.*	
Corn	1,620	$36,000	Produce	380	$56,150
Flour	200	10,000	Railroad ties	200	800
General merchandise	975	121,875	Salt	150	1,200
Live stock	160	19,200	Tanbark	150	1,125
Logs	1,635	9,810	Wheat	150	5,000
Lumber	660	6,750			
Oats	640	25,600	Total	7,040	295,910
Peas	120	2,400			

Passengers carried, 360.

The steamer *N. B. Forrest* makes regular weekly trips between Charleston and Chattanooga during the season of navigation.

Comparative statement of commerce for the past two years.

Year.	Quantity.	Estimated value.
	Tons.	
1906	3,563	$139,225
1907	7,040	295,910

(c) HOLSTON RIVER.

After completing the season's work of maintenance on the Clinch River the working party was transferred to Kingsport, Tenn., the accepted head of navigation on the Holston, about 142 miles from the mouth. Here the necessary boats for the use of the men were constructed in the latter part of September, at a total cost of $245. These consisted of one canvas-covered quarter boat, 12 by 32 feet; one canvas-covered kitchen boat, 10 by 24 feet; one open barge, 10 by 24 feet; and one 16-foot skiff.

On the way to the mouth of the river, which was reached on November 20, all obstructions which could be successfully handled by the working party were removed from the channel. The following

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work was done at a total cost of $1,148.59, which includes the construction of boats and all incidental expenses:

Snags removed		189
Overhanging trees cut		163
Loose material removed	cubic yards	20
Rock ledges, etc., blasted and removed	do	142

The use of this river except for the rafting of logs is insignificant. It does not appear that further improvement is warranted at the present time, as the condition of the stream will now probably be satisfactory for a number of years. It is recommended that appropriations be suspended for the present.

Money statement.

July 1, 1907, balance unexpended	$1,500.00
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1,181.95
July 1, 1908, balance unexpended	318.05

APPROPRIATIONS.

June 13, 1902 (allotment dated July 5, 1902)	$5,000.00
March 2, 1907 (allotment dated March 25, 1907)	1,017.17
Total	6,017.17

COMMERCIAL STATISTICS.

Calendar year 1907:		
Logs (rafted)—		
Quantity	tons	12,240
Estimated value		$61,200

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APPENDIX E E.

IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST CINCINNATI, OHIO, DISTRICT.

REPORT OF COL. WM. T. ROSSELL, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Ohio River (general improvement).
2. Construction of Lock and Dam No. 37, Ohio River.
3. Operating snag boats on Ohio River.

UNITED STATES ENGINEER OFFICE,
Cincinnati, Ohio, July 18, 1908.

SIR: I have the honor to transmit herewith the annual reports of the works under my charge for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

WM. T. ROSSELL,
Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

E E 1.

IMPROVEMENT OF OHIO RIVER.

GENERAL IMPROVEMENT.

Operations on this improvement were in progress during the last fiscal year under the general project that has been in force for many years, as follows:

DIKES AND LOW DAMS IN THE OHIO RIVER—CONSTRUCTION.

Browns Island dam (60.5 miles below Pittsburg).—The old structure, closing back channel, was originally built in 1837–8; subsequent repairs were made to this dam between that time and 1906 (Reports of Chief of Engineers, 1905, Appendix D D, pp. 1786–1787, and Appendix E E, 1907, pp. 1653–1654). Proposals for the construction of

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a new and shorter dam of concrete, stone, and piles, to replace the old structure, were advertised June 8, 1907. Bids were opened July 18, 1907, but those received were so high that a readvertisement was recommended and approved. Proposals were again advertised August 12, 1907, and bids opened September 11, 1907. One proposal only was received, and the aggregate of this was $2,042.10 greater than the lowest bid received on July 18, 1907. Rejection of this bid and a delay in further advertisement was recommended and approved.

Marietta Island dam (168.9 miles below Pittsburg).—The old structure, closing back channel, was begun in 1871; it was subsequently repaired from time to time between that date and 1906 (Reports of Chief of Engineers, 1905, Appendix D D, pp. 1787–1790, and 1907, Appendix E E, p. 1654). No bids having been received in response to the first advertisement of May 29, 1907, the work was readvertised and proposals opened September 11, 1907. The lowest aggregate bid was that of Knobloch & Shelton, of Erie, Pa. Acceptance of this bid was recommended and approved, and contract entered into October 14, 1907. The contractors assembled their plant, procured material, cleaned the site, and began active operations in June, 1908. During the fiscal year the permanent work done and material supplied was as follows:

Excavation	cubic yards	889
Piles	number	21

The work is now in progress under favorable conditions.

Dike at head of Grand Chain (about 943 miles below Pittsburg).—Under project approved February 18, 1905, the construction was proposed of a riprap dike in the Ohio River at the head of Grand Chain (Reports of Chief of Engineers, 1904, Appendix D D, pp. 2478–2482, and 1907, Appendix E E, pp. 1654–1655). In response to an advertisement dated May 6, 1907, but a single proposal was received on June 9. This bid was recommended for rejection and the same approved July 11, 1907. Proposals for the work were readvertised August 12, 1907, for the third time, but the only bid received being considered excessive, its rejection was authorized. An informal bid was received September 23, 1907, and authority therefor having been received, a contract for the work was entered into with Oscar F. Barrett, of Cincinnati, Ohio, on October 14, 1907.

River conditions were unfavorable for the prosecution of construction during the remainder of the season of 1907, and low-water stages at the site of dike have not yet set in for the season of 1908. Present indications are favorable for the construction of dike during the coming low-water season.

Mound City, Ill., dikes (about 958 miles below Pittsburg).—This work is described in Reports of Chief of Engineers, 1906, Appendix E E, page 1542, and 1907, Appendix E E, page 1655. This dike is located so near the mouth of the Ohio that it is affected by back water from the Mississippi River, as well as flood stages in the Ohio. The season of 1907 was so unfavorable that no active operations could be carried on during that period. The present working season opens more favorably, and it is hoped that active operations may be resumed and the unfinished work completed during the present year.

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GREAT MIAMI EMBANKMENT.

The river and harbor act of March 2, 1907, contained an item referring to the Great Miami, or Lawrenceburg, embankment, as follows:

> Improving the Great Miami Embankment of Ohio River east of Lawrenceburg, Indiana; repairing damage caused by the recent flood of the Ohio River and tributaries, twenty thousand dollars, if such repair shall be directly and necessarily required in the interests of navigation.

In accordance with the above provision, an examination was made of the bar opposite the city of Lawrenceburg, Ind., which showed that an apparent improvement had been made in the channel at this point by reason of the construction of the Great Miami or Lawrenceburg embankment.

A project for the expenditure of the funds conditionally appropriated for the repair of the existing embankment was approved September 9, 1907, with the proviso that the materials needed for the work should be furnished by the local authorities free of cost to the United States.

Under date of October 28, 1907, proposals were invited for the labor necessary to do the work contemplated, and a contract was entered into with Thomas J. McKim, of Lawrenceburg, Ind., the lowest bidder, December 19, 1907, at the following rates:

> Earth fill, 35¼ cents per cubic yard.
> Concrete, 56¼ cents per square yard.

Owing to the lateness of the season the contractor was not ordered to begin work until May 14, 1908; he at once commenced active operations, and by the close of the fiscal year material had been placed as follows:

Earth fill	cubic yards	7,392.5
Concrete	square yards	358¾

ICE PIERS.

Gallipolis, Ohio (267.5 miles below Pittsburg).—This work is described in Reports of the Chief of Engineers, 1905, Appendix D D, pages 1795–1796; and 1907, Appendix E E, page 1655.

Under contract with Frank J. Du Vall and Fred C. Du Vall, dated June 30, 1905, work was carried on and completed during the fiscal year. During the fiscal year ending June 30, 1908, material was supplied and work completed as follows:

Pumping	days of 24 hours	18
Excavation	cubic yards	238.5
Wrought iron or steel in protection or forms	pounds	6,082
Wrought iron or steel nosings, anchors, etc	do	7,010
Concrete masonry	cubic yards	1,467.13
Timber forms	feet B. M.	11,547

The total material supplied and placed in the work has been as follows:

Timber protection	feet B. M.	14,018
Pumping	days of 24 hours	25
Excavation	cubic yards	797.34
Wrought iron or steel in protection or forms	pounds	6,293
Wrought iron or steel nosings, anchors, etc	do	7,010
Concrete masonry	cubic yards	1,657.21
Timber forms	feet B. M.	11,547

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The United States has furnished all the cement, of which 1,608¼ barrels were used in the work, at a total cost of $2,046.73.

The work thus far done constitutes an enlargement of the present ice harbor protection at Gallipolis. It will be necessary within a short time to replace the two old structures of timber cribbing with concrete.

HARBOR LINES.

The established harbor lines over which supervision is exercised by this office are those of Steubenville, Wheeling, Ironton, and Cincinnati.

The usual work was continued during the year in the investigation of encroachments and of permits requested or authorized.

The survey required in connection with tentative harbor lines at East Liverpool, Ohio, having been completed, the map was platted during the fiscal year. Minor changes are now being made prior to discussion of the harbor lines at a public hearing, submitting same for final approval, and marking them by means of monuments.

CINCINNATI HARBOR LINE.

The Cincinnati harbor lines, which were approved by the Secretary of War in 1892, were not marked out on the ground. The location was approximately determined by distances from buildings shown on the map.

The buildings on the river front, as a rule, are not of durable construction. Many of them have been removed or altered since the survey to establish harbor lines was made. As the original survey stations were not marked, it became necessary to mark the location of the lines before the remaining buildings were removed.

A survey party was employed in the field from the beginning of the fiscal year until the last of May, 1908, when the field work was finished.

The lines were run and adjusted, and marked with 300 numbered concrete posts buried in the ground. A painted wooden marker post was placed a definite distance from each concrete post and the concrete posts were further witnessed by angles to permanent objects.

Map tracings showing the location of the harbor lines and posts are being prepared at the close of the fiscal year.

PERMITS.

Applications for special permits require a considerable expenditure of time and labor for the necessary examination in the field and subsequent supervision in order to secure compliance with harbor-line restrictions or, where no harbor lines have been established, with the general laws prohibiting encroachments on navigable waterways. The total number of permits granted during the year and pertaining to this district was 29, of which 2 were for gas pipe lines, 1 for water pipe line, 3 for overhead cables, 5 for submarine cables, 1 for incline, 1 for intake, 5 to dredge for sand and gravel, 1 to construct a warehouse and incline, 1 to raise sunken logs, 1 to construct and maintain concrete masonry piers, 1 for bank protection, 1 for coal tipple, 2 for

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dumpage, 1 for water pipe line and suction wells, 2 for borings, and 1 for ice breaker.

BRIDGES.

Plans submitted by the Kanawha and Michigan Railway Company for rebuilding the superstructure of the side span of its bridge over the Ohio River at Point Pleasant, W. Va., were approved by the Acting Secretary of War March 10, 1908.

DREDGING.

The work of the United States dredges is as follows:

Captina Island bar (*107.2 miles below Pittsburg*).—At the beginning of the fiscal year the dredge *Ohio* was engaged dredging off the point of a gravel bar extending from the Ohio shore opposite the head of Captina Island, with a view of widening and straightening the channel past this point. The work was completed July 10. The area dredged was about 110 feet wide, 800 feet long, to a depth of 6 feet below low water, materially improving navigation at this place.

The excavated material was dumped on the West Virginia side above the dam at the head of Captina Island.

Excavation made, July 1 to July 10: Gravel, bowlders, loose rock, etc., 8,970 cubic yards; rocks removed, five, 5.17 tons.

Fish Creek Island (*112.8 miles below Pittsburg*).—At the beginning of the fiscal year the dredge *Oswego* was engaged dredging off the point of the bar on the Ohio shore and the lower end of the island bar just above Blair Run, with a view of widening and straightening the channel at this place. The work was completed July 19. The area dredged is about 160 feet wide, 860 feet long, to a depth of 6 feet below low water, materially improving navigation at this place.

The excavated material was dumped along the West Virginia shore below Fish Creek Island.

Excavation made, July 1 to July 19: Gravel, bowlders, loose rock, etc., 14,975 cubic yards.

Opossum Creek bar (*119.6 miles below Pittsburg*).—Several pilots had complained of striking an obstruction, supposed to be a rock, in the channel excavated at this place in 1905. On the way down the river the *Ohio* stopped and a careful search was made for the obstruction. No rock was found, but a small stump was found which had probably been carried there by high water and lodged in the channel. This stump, weighing 0.25 ton, was removed.

Davenport Landing, W. Va. (*140.7 miles below Pittsburg*).—While the dredges were at work at Mill Creek bar in 1904, through a misunderstanding, a few scow loads of material were dumped too near Davenport Landing. The *Ohio* stopped and removed this material. Excavation made, July 12: Gravel and sand, 320 cubic yards.

Bat and Grape islands (*151.6 miles below Pittsburg*).—The object of dredging at this place is to widen and straighten the channel by removing the point of the creek bar on the Ohio side and a portion of the island bar opposite. Work was started by the *Ohio* on the island bar, but before the first cut was completed the river rose to a height of 18.5 feet, stopping operations. The area dredged was 35 feet wide, 600 feet long, to a depth of 6 feet below low water.

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Excavated material was dumped in the chute back of Grape Island.

Excavation made, July 17 to 19: Gravel and sand, 4,450 cubic yards.

Short Creek bar (*81.2 miles below Pittsburg*).—After completing the work at Fish Creek Island, the *Oswego* was ordered to Short Creek bar. The channel was cleared at this place by hired dredging plant in 1906, but floods in the creek had again brought out a large amount of gravel and loose rock and obstructed the channel to some extent, and it was considered advisable to widen the channel still further.

When high water stopped the dredging at Grape and Bat islands the *Ohio* was also ordered to Short Creek bar.

It was found impossible to work both dredges to advantage at this place, and after one day the *Oswego* was sent to Wheeling Creek bar and the *Ohio* was left to complete the dredging at Short Creek bar. The area dredged was 160 feet wide, 500 feet long, to a depth of 6 feet below low water, materially improving the channel.

Excavated material was dumped on the West Virginia shore below the bar.

Excavation made, July 23 to August 2: Gravel, bowlders, loose rock, etc., 11,178 cubic yards; rocks removed, six, 9.72 tons.

Wheeling Creek Bar (*90.4 miles below Pittsburg*).—Upon completion of work at Short Creek bar the *Ohio* proceeded to Wheeling Creek bar, where the *Oswego* had been employed. Both dredges worked at this place until a rapid fall of river made it necessary to leave the work unfinished and proceed farther downstream. The area dredged was about 110 feet wide, 700 feet long, to a depth of 6 feet below low water.

The channel was much improved by the work done, but required additional work.

In June, 1908, the dredges again worked at this place, making an additional cut 5 feet below low water, 35 feet wide and 600 feet long. Work at this place was in progress at the end of the fiscal year.

The excavated material was dumped on the Ohio shore about a mile below the bar, the nearest available dumping ground.

Excavation made, July 24 to August 8, 1907: Gravel, bowlders, and loose rock, etc., 10,570 cubic yards; rock removed, one, 4 tons; snag removed, one, 0.58 ton. June 25 to June 30, 1908: Gravel, stone, and brick, 3,994 cubic yards.

Newberry Island bar (*194.5 miles below Pittsburg*).—Some dredging was done at this place in 1905, but was stopped by low water before completion. When work was stopped at Wheeling Creek bar the dredges were moved down to this place and continued the work of dredging off the bar at the lower end of the island, which had been interrupted in 1905. The area dredged was about 100 feet wide, 1,200 feet long, to a depth of 6 feet below low water, materially improving the channel.

Excavated material was dumped close below foot of island.

Excavation made, August 10 to 16: Gravel and sand, 14,469 cubic yards; rocks removed, seven, 18.97 tons.

Eight-mile Island bar (*257.7 miles below Pittsburg*).—After leaving Newberry Island the dredges stopped at this place and began work of dredging off the bar on the West Virginia shore below the island, where tows had trouble in passing. After working three days, a fall-

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ing river forced a temporary suspension. Work was resumed when the river had reached a more favorable stage. The area dredged was about 120 feet wide, 1,400 feet long, to a depth of 6 feet below low water, materially improving the channel.

Excavated material was dumped behind the dike on the Ohio side of the river.

Excavation made, August 19 to September 21: Gravel and sand, 18,241 cubic yards.

Gallipolis Island (268.1 miles below Pittsburg).—When low water forced the dredges to suspend work at Eight-mile bar they were taken to Gallipolis Island and began dredging off the bar on the West Virginia side of the river opposite the foot of the island. This bar has caused considerable trouble to passing tows. After three days a rise in the river made it desirable to move the dredges up to Jenny Lind bar, where it was thought work could be prosecuted to advantage. When river fell the dredges were returned to Gallipolis Island.

On the night of September 3, about 9.30 o'clock, while the dredges were lying in position for work, the steamer *Henry M. Stanley*, coming downstream, got out of the channel, struck the bar just above the *Oswego*, and swung down against that dredge, breaking all three of her spuds. The dredge was laid up for repairs for about a week.

The *Ohio* continued dredging and also assisted in removing the wreck of the *Stanley*.

High water again stopped work, and the dredges were taken up to Eightmile bar. When work was completed there the dredges were returned to Gallipolis Island, and the dredging at that place completed. The area dredged was about 1,800 feet long, varying in width from 35 feet at the upper and lower ends to 130 feet at the point of the creek bar, to a depth of 6 below low water, resulting in a much improved channel for passing tows.

Excavated material was dumped on the Ohio shore about 3,500 feet below the work.

Excavation made, August 22 to October 1: Gravel and sand, 22,139 cubic yards; rocks removed, nine, 29.32 tons; snags removed, three, 2.6 tons.

Jenny Lind bar, opposite Oldtown tow-head (225.4 miles below Pittsburg).—When work at Gallipolis Island was interrupted in the latter part of August the dredges were sent up to Jenny Lind bar to straighten and widen the channel to facilitate the passage of tows. Three cuts, 35 feet wide, 6 feet below low water, were started, but after one had been extended 240 feet, one 470 feet, and one 190 feet, the work was stopped by a rapid fall in the river, and the dredges were moved farther downstream.

Excavated material was dumped in a pocket just below the tow-head.

Excavation made, August 27 to 31: Gravel and sand, 5,041 cubic yards.

Twin Creek bar (272.5 miles below Pittsburg).—After the completion of dredging at Gallipolis Island, the dredges were moved down the river to Twin Creek bar, with a view of widening and straightening the channel at that place. High water interfered to some extent, a week's time being lost from dredging on that account. The area dredged was about 1,750 feet long, 110 feet wide, to a depth

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of 6 feet below low water, materially improving navigation at this place.

Excavated material was dumped along the Ohio and West Virginia shores about 3,500 feet below the bar.

Excavation made, October 4 to 26: Gravel, bowlders, loose rock, etc., 27,486 cubic yards; snag removed, one, 4.6 tons.

Salt River bar (626.5 miles below Pittsburg).—In response to urgent request from persons interested in the navigation of the river below Louisville, after completing the dredging at Twin Creek bar the dredges were sent down the river to Salt River bar. Two cuts 35 feet wide, 4 feet below low water, were started. One was extended 180 feet and the other 300 feet when work was stopped by high water. As it was so late in the season, with no prospect of the river reaching a working stage before it would be necessary to lay up for the winter, the dredges were ordered back up the river.

The excavated material was dumped along the Indiana shore about 1,200 feet above the work.

Excavation made, November 2 to 4: Gravel and sand, 1,837 cubic yards.

Middleport Ice Harbor (251.7 miles below Pittsburg).—When the dredges left Salt River bar it was the intention to stop them at Fivemile and Ninemile bars to do some dredging should the conditions be favorable for work. When the dredges reached Cincinnati the river was too high for work, with no prospect that it would reach a working stage before it would be necessary to place the fleet in winter quarters. It was therefore decided to send the dredges up to Marietta and lay them up.

A hired dredging plant had been employed dredging at Middleport, with a view of removing the bar below the ice pier so as to enlarge the space for use as an ice harbor. This hired dredge had been released temporarily to remove the false work of the Kanawha and Michigan Railway bridge at Point Pleasant, W. Va., leaving the work incomplete.

When the dredges reached Middleport the river was at a favorable stage for work, and it was deemed best to stop and remove the material necessary to complete the work. The area dredged by the hired plant and the United States dredges together was about 300 feet wide, 1,700 feet long, from 4 to 6 feet below low water, very materially increasing the space available for boats to tie up at times of danger from ice.

Excavated material was scattered in deep water.

Excavation made, November 20 to 25: Gravel and sand, 10,836 cubic yards; rock removed, one, 2.5 tons.

After completing the work at Middleport, the dredges were ordered to winter quarters in the mouth of the Muskingum River at Marietta, Ohio.

The dredging fleet was placed in winter quarters in the mouth of the Muskingum River, at Marietta, Ohio, on November 30, and the twoboat tenders for the dredges were discharged. Four members of the dredge crews were retained on the dredges during the winter months to care for the fleet and to make such repairs as were practicable.

In the early part of March, 1908, the annual repairs were begun. New superheating coils were placed in the boiler of the dredge

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Oswego. Repairs were made to the aft spud machinery of both dredges, and the worn-out parts were renewed. One new dipper pole was built and placed on the dredge *Ohio.*

The dredge *Oswego* was placed on the docks at Point Pleasant, W. Va., where the loose rivets in hull plating around forward spud boxes were replaced.

Dump scows *Nos. 1, 2* and *3* were also placed on the docks for repairs. All the bin planking, sheathing, and a portion of the planking on the rakes of the scows were renewed. The sides and the bottoms of the scows were recalked.

Scow *No. 4* was in unserviceable condition and was reconstructed, under contract, by the Kanawha Dock Company, of Point Pleasant, W. Va.

On May 20 the dredging plant, with the exception of scow *No. 4*, was ready for operations, and part of the fleet was started up to Bakers Island. Owing to the swift current the fleet was divided, the steamer *M. D. Wayman* proceeding with the dredge *Ohio* and part of the fleet, arriving at Bakers Island on May 23. The steamer *Wayman* returned to Marietta, Ohio, for the dredge *Oswego* and the remainder of the fleet, arriving at Bakers Island the evening of May 28. Owing to a rise in the river and the danger of passing coal fleets, the dredging was delayed until June 1, on which date the dredge *Oswego* was placed for work on the Island bar, left of channel, at head of Bakers Island. The dredge *Ohio* was put to work on the Run bar, on the Ohio shore, below the Government light at the head of Bakers Island.

Head of Bakers Island (49 miles below Pittsburg).—The improvement desired at this place is widening and straightening the channel between the head of the island and the Ohio shore, by removing the creek bar on the right, below Government light, and a portion of the island bar, on left of channel. The creek bar was partly removed last year, but it was found advisable this season to continue the cuts made last season to deeper water below. An additional cut was made at the mouth of the creek to provide for material which is put out by the run at the time of heavy rains.

The work on the creek bar consisted of making two cuts, 6 feet below low water, covering an area averaging from 35 to 70 feet wide and about 800 feet long.

The work on the island bar consisted in making three cuts, 6 feet below low water, widening the channel for a distance of about 2,450 feet, the combined widths of the three cuts varying from 35 feet to 105 feet. More work on the island bar will be of benefit to the channel, but owing to the low stage of the river the dredges were compelled to move to some location below.

The excavated material was dumped on the West Virginia shore, above the head of the island.

Excavation made, creek bar, June 1 to 9: Sand, gravel, and clay, 6,517 cubic yards; rocks removed, six, 7.1 tons; log, one, 3 tons. Island bar, June 1 to 23: Sand and gravel, 26,589 cubic yards; snags removed, three, 2.1 tons.

Jonathan Run bar (89 miles below Pittsburg).—On leaving Bakers Island the dredges separated, the *Ohio* going to Jonathan Run bar, near the head of Wheeling Island, and the *Oswego* to Wheeling Creek bar, near the foot of Wheeling Island. The improvement to

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be made at Jonathan Run bar is the opening up of the old original channel, down along the West Virginia shore, by removing that portion of the bar immediately at the mouth of Jonathan Run. One cut, 4 feet below low water, 35 feet wide, and 500 feet long, has been made and a second cut begun.

The excavated material was scattered in the deep water of the channel, about one-half mile above the bar.

Excavation made, June 26 to 30: Hard gravel and sand, 2,529 cubic yards; rocks removed, one, 2.5 tons.

Work in progress.

Summary of expenditures for United States dredges.

General supplies and expenses	$2,490.98
Towing and fuel	13,630.78
Repairs (including cost of reconstructing dump scow, $4,250)	8,074.74
Salaries	15,505.96
	39,702.46

The total excavation by the United States dredges during the fiscal year was 190,141 cubic yards, and the cost per cubic yard, including all expenditures and outstanding liabilities, was 20+ cents.

From July 1 to November 25, 1907, and from June 1 to June 30, 1908, the time lost was—

	Days.
Sundays	27
Holidays	10.5
Traveling	43.725
Coaling	2.95
Accidents	17.6
High water	12.05
Passing tows	2.45
Total lost	116.275
Time at work	78.725

CONSTRUCTION OF HYDRAULIC AND GRAPPLE DREDGING PLANT.

Under contract with the Howard Ship Yards Company, of Jeffersonville, Ind., dated November 1, 1906, the steel dredge hull has been completed, and under contract with the same company dated March 11, 1908, for building cabin and upper works on this dredge hull, at a cost of $7,859, the work was finished on June 30, 1908, when the dredge left Jeffersonville for delivery at Cincinnati.

Under contract with the Springfield Boiler and Manufacturing Company, of Springfield, Ill., dated July 23, 1907, for building ten pontoons to carry the discharge pipe line, for $13,800, the pontoons were completed and delivered at Cincinnati on April 4, 1908. The pontoons are 40 feet long, 12 feet wide, and 3 feet 2 inches in depth, built of steel, and are fitted with carriages for the pipe line. After delivery they were placed on the river bank of the Government property at Dam No. 37, where they were afterwards fitted with steel cavels, making all ready for service with the exception of one, which will require some fittings for attachment to the pipe line of the dredge.

Under contract with the American Bridge Company, of New York, dated January 13, 1908, to build a steel-decked flatboat for $7,425, the framing of the floor, sides, and deck has been built, part of the floor riveted in place, and part of the framing of the rakes set up.

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The flatboat is 110 feet long and 24 feet wide, with a depth of 5 feet amidships and 6 feet at the ends, both of which are raked, and is intended for use with the hydraulic dredge plant.

Contract with the Ellicott Machine Company, of Baltimore, Md., for furnishing and installing the boilers and machinery for the hydraulic and grapple dredge, at a cost of $59,925, has been made and forwarded for approval.

This contract covers the entire operating machinery of the dredge, for use both with pump and grapple, except the orange-peel bucket, complete and ready for operation.

HIRED DREDGING PLANTS.

Middleport Ice Harbor (251.7 miles below Pittsburg).—Under contract dated April 15, 1907, with the Monongahela and Western Dredging Company, for the hire of a dredging plant to be operated at Middleport, Ohio, Ice Harbor, and other points above Cincinnati, Ohio, work was begun at Middleport July 1, with a view to removing the bar below the ice piers at this place so as to increase the available space for boats to tie up at times of danger from ice. Work was continued until October 21, when the plant was released to remove the false work of the Kanawha and Michigan Railway Bridge at Point Pleasant, W. Va., it being estimated that this work would require about ten days. The work was delayed, however, by accidents and high water preventing the return of the plant to Middleport at the time expected. The plant was discharged November 21, and the dredging at Middleport was completed by the United States dredges as stated in the report of the work of those dredges.

The excavated material was scattered in deep water near the West Virginia shore. The cost of dredging per cubic yard was $0.178.

Excavation made, July 1 to October 21: Gravel and sand, 63,530 cubic yards.

Connoconneque bar (366.5 miles below Pittsburg).—Under contract dated July 26, 1907, with Sheridan-Kirk Contract Company, for the hire of a dredging plant, work was begun at Connoconneque bar August 31, with a view to straighten the channel by dredging off the point of the creek bar. After working three days making a part of one cut 30 feet wide, 110 feet long, 6 feet below water, upon urgent call from persons interested in the navigation of the river the plant was ordered to Rising Sun bar.

The excavated material was dumped below the bar on the West Virginia shore.

Excavation made, August 31 to September 5: Gravel, 1,215 cubic yards.

Rising Sun bar (504.3 miles below Pittsburg).—Complaint had been made that the channel at Rising Sun was obstructed by a bar that had formed just above the lower dike. The Sheridan-Kirk Contract Company's plant began work cutting a channel through this bar September 11 and finished the work November 6. A rise in the river made it impracticable to work the plant at other places, so after remaining inactive until November 13 the plant was discharged. Work was considerably retarded by high water.

The result of the work at this place was the cutting of a channel through the bar about 800 feet long, 100 feet wide, 6 feet below low

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water, removing the hard gravel, logs, and wreckage which had mad this bar a serious obstruction to navigation.

The excavated material was deposited on the Kentucky sh behind this bar.

Excavation made, September 11 to November 6: Gravel and sa 26,075 cubic yards; logs removed, fifteen, 20 tons; wreckage, 12, feet B. M.

The cost of dredging at Connoconneque bar and Rising Sun b was $0.367 per cubic yard.

ESTIMATE FOR APPROPRIATION.

Low dikes and dams:		
1 stone, pile, and concrete dam at head of Buffington Island to replace existing loose stone structure		$37,
Repairs to half-moon dam in main channel opposite Buffington Island, replacing stone		1,
Removal of Sand Creek dike entire, including dredging		21,
Ice piers:		
Rebuilding ice piers at Middleport, Ohio, in concrete		35,
Removal of old and now dangerous ice piers at Hartford, W. Va., and Pomeroy, Ohio		10,
Supervision of harbor lines at East Liverpool, Ohio; Steubenville, Ohio; Wheeling, W. Va.; Ironton, Ohio, and Cincinnati, Ohio; also Secretary of War permits and encroachments on general river		12,
Minor examinations and surveys		14,
Dredging operations:		
4 dredges, 2 years		144,
1 towboat, 2 years		16,
2 steel or composite hull towboats		80,
Hire of 1 dredging plant for operations between Pennsylvania State line and Wheeling, W. Va., 3 months	$37,400	
Hire of 1 dredging plant for operations between Wheeling, W. Va., and Marietta, Ohio, 3 months	37,400	
		74,
General administration, engineering, inspection, storage, etc., 1 year		60,
Contingencies		39,
Total		545,

Money statement.

July 1, 1907, balance unexpended		$690,043.67
July 30, 1907, to June 29, 1908, received from sales, etc		318.91
		690,362.
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$90,253.74	
For maintenance of improvement, $17,415.84, less $0.75 refunded	17,415.09	
		107,668.
July 1, 1908, balance unexpended		582,693.
July 1, 1908, outstanding liabilities		3,071.
July 1, 1908, balance available		579,621.
July 1, 1908, amount covered by uncompleted contracts		173,557.07
Amount (estimated) required for completion of existing project		Indefinite.
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement and for maintenance, in addition to the balance unexpended July 1, 1908		545,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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AMOUNTS AND DATES OF ALL APPROPRIATIONS FOR THIS WORK.

Act of Congress.	Appropriation.	Allotment.	Remarks.
March 3, 1827	$30,000.00		
March 3, 1835	50,000.00		
July 2, 1836	20,000.00		
March 3, 1837	60,000.00		
July 7, 1838	50,000.00		
June 11, 1844	100,000.00		
March 3, 1847	6,479.25		
August 30, 1852	90,000.00		
June 23, 1866		$172,000.00	Improving Mississippi, Missouri, Arkansas, and Ohio rivers.
Do		80,000.00	Snag boats and apparatus for improving western rivers.
March 2, 1867	100,000.00		
July 25, 1868		85,000.00	Repair, preservation, extension, and completion of river and harbor works.
July 11, 1870	50,000.00		
March 3, 1871	50,000.00		
June 10, 1872	200,000.00		
March 3, 1873	200,000.00		
June 23, 1874	150,000.00		
March 3, 1875	300,000.00		
August 14, 1876	175,000.00		
June 18, 1878	300,000.00		
Do	50,000.00		Harbor of refuge at or near Cincinnati.
March 3, 1879	250,000.00		
June 14, 1880	250,000.00		
March 3, 1881	350,000.00		
March 21, 1882	100,000.00		Continuing work on Davis Island dam.
August 2, 1882	350,000.00		
Do	16,000.00		Harbor of refuge near Cincinnati, Ohio.
July 5, 1884	600,000.00		
Do	17,000.00		Do.
August 5, 1886	375,000.00		
August 11, 1888	320,000.00		
September 19, 1890	300,000.00		
January 19, 1891	2,128.87		Relief of Stubbs & Lackey. Treasury settlement No. 2593.
July 13, 1892	366,000.00		
August 18, 1894	250,000.00		
June 3, 1896	250,000.00		
July 1, 1898		15,000.00	For restoring levee and banks of Ohio River at or near Shawneetown, Ill.
March 3, 1899	375,000.00		
June 13, 1902	359,000.00		Amount appropriated, $400,000, $41,000 being for falls of Ohio River at Louisville, Ky.
July 1, 1902	25,000.00		Between Cairo and Mound City.
March 3, 1905	208,200.00		Amount appropriated, $300,000, $20,800 being for dredging in pool 6, Ohio River, $56,000 for survey of Ohio River, and $15,000 for rock removal at head of canal at falls at Louisville, Ky.
March 2, 1907	450,000.00		
Do	20,000.00		For Great Miami embankment east of Lawrenceburg, Ind.
Total	7,268,808.12	852,000.00	

Total of appropriations, 1827–1907	$7,268,808.12	
Total of allotments, 1827–1898	352,000.00	
Received from sales, etc., 1866–1908	9,411.40	
Received from Treasury settlements, 1904, 1906	261.70	
Transferred from other appropriations, 1905	13,642.48	
		$7,644,123.70
Appropriations not drawn, 1827, 1852, and 1902	30,023.47	
Allotments not drawn, 1866, 1868	43,134.60	
Returned by Treasury settlements	30.07	
Amount transferred to other works	125,168.44	
Deposited to credit of "Miscellaneous receipts" (sale of maps)	4.25	
		198,360.83
Total		7,445,762.87

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CONTRACTS IN FORCE.

Name of contractor: Frank J. Du Vall and Fred C. Du Vall.
Amount and character of work: $11,397.96. Constructing concrete sectio of ice pier in Ohio River at Gallipolis, Ohio.
Price per unit: Timber protection, at $74.50 per 1,000 feet B. M.; pumpi at $12 per day of twenty-four hours; excavation, at $1.85 per cubic yar wrought iron or steel in protection and forms, at $0.065 per pound; wrought-ir or steel nosings, anchors, etc., at $0.0875 per pound; concrete masonry (Unit States to furnish cement), at $4.24 per cubic yard; timber forms, at $48.50 p 1,000 feet B. M.
Date of approval: July 13, 1905.
Date of beginning: 30 days after notification of approval of contract.
Date of expiration: 100 fair working days after July 15, 1905. Time li waived. Completed.

Name of contractor: Oscar F. Barrett.
Amount and character of work: $37,212.50. Extension and repair of dikes i Ohio River at Mound City, Ill.
Price per unit: Stone, 6 to 10 cubic feet each, at $3.25 per cubic yard; ½ to 1 cubic feet each, at $2.70 per cubic yard.
Date of approval: June 23, 1905.
Date of beginning: July 1, 1905.
Date of expiration: 200 fair working days after commencement.

Name of contractor: The Queen City Marine Railway Company.
Amount and character of work: $240. Rent of storage room.
Price per unit: $20 per month.
Lease dated December 27, 1906.
Date of beginning: January 1, 1907.
Date of expiration: December 31, 1907. Completed.

Name of contractor: Burnside & Burkesville Transportation Company.
Amount and character of work: $9,000. Hire of towboat as tender to Unit States dredges during season of 1907.
Price per unit: $42.35 per day.
Date of approval: May 29, 1907.
Date of beginning: June 8, 1907.
Date of expiration: About December 1, 1907. Discharged November 30, 190

Name of contractor: Howard Ship Yards Company.
Amount and character of work: $19,830. Construction of steel dredge hull with mast, boom, upper-works framing, etc.
Price per unit: $19,830.
Date of approval: November 10, 1906.
Date of beginning: November 26, 1906.
Date of expiration: 242 days from date of beginning. Time limit waived. Completed.

Name of contractor: Monongahela and Western Dredging Company.
Amount and character of work: $11,000. Hire of dredging plant.
Price per unit: For dredge boat with three dump scows for work above Cincinnati, Ohio: With single crew at $80 and with double crew at $160 per working-day when at work; for same when inactive by order of the inspector, with single crew at $40 per calendar day, increased by 50 per cent for additional crew.
For towboat as tender, for work above Cincinnati, Ohio: With single crew at $40 and with double crew at $80 per working-day when at work; for same when inactive by order of the inspector, with single crew at $25 per calendar day, increased by 50 per cent for additional crew.
For furnishing dredge boat with three dump scows for work below Cincinnati, Ohio: With single crew at $88 and with double crew at $176 per working-day when at work; for same when inactive by order of the inspector, with single crew at $40 per calendar day, increased by 50 per cent for additional crew.
For towboat as tender, for work below Cincinnati, Ohio: With single crew at $45 and with double crew at $90 per working-day when at work; for same when inactive by order of the inspector, with single crew at $25 per calendar day, increased by 50 per cent for additional crew.

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For suitable separate room and board of inspectors, at $15 per month for each inspector.
Date of approval: April 22, 1907.
Date of beginning: July 1, 1907.
Date of expiration: When amount available is exhausted, or at close of season. Discharged October 31, 1907.

Name of contractor: H. J. Mendel.
Amount and character of work: $3,000. Hire of towboat and crew as additional tender to U. S. dredges.
Price per unit: $40 per day.
Emergency contract dated June 24, 1907.
Date of beginning: June 24, 1907.
Date of expiration: 60 days, or until discharged. Discharged November 30, 1907.

Name of contractor: The Springfield Boiler and Manufacturing Company.
Amount and character of work: $13,800. Construction of ten pontons.
Price per unit: $1,380.
Date of approval: July 31, 1907.
Date of beginning: Thirty days after notification of approval of contract.
Date of expiration: April 1, 1908. Completed.

Name of contractor: Sheridan-Kirk Contract Company.
Amount and character of work: $11,000. Hire of dredging plant.
Price per unit: For dredge boat with two dump scows for work above Evansville, Ind.: With single crew at $68 and with double crew at $136 per working-day when at work; for same when inactive by order of the inspector, with single crew at $62.50 per calendar day, increased by 50 per cent for additional crew.
For towboat as tender, for work above Evansville, Ind.: With single crew at $55 and with double crew at $110 per working-day when at work; for same when inactive by order of the inspector, with single crew at $45 per calendar day, increased by 50 per cent for additional crew.
For dredge boat with two dump scows for work below Evansville, Ind.: With single crew at $68 and with double crew at $136 per working day when at work; for same when inactive by order of the inspector, with single crew at $62.50 per calendar day, increased by 50 per cent for additional crew.
For towboat as tender, for work below Evansville, Ind.: With single crew at $55 and with double crew at $110 per working day when at work; for same when inactive by order of the inspector, with single crew at $45 per calendar day, increased by 50 per cent for additional crew.
For suitable separate room and board of inspectors, at $15 per month for each inspector.
Date of approval: August 6, 1907.
Date of beginning: August 30, 1907.
Date of expiration: November 13, 1907. Completed.

Name of contractor: Knobloch & Shelton.
Amount and character of work: $53,204.60. Constructing dam at head of Marietta Island, Ohio River.
Price per unit: Excavation, at $0.95 per cubic yard, measured in the cut; piles, at $22 each; iron tie-rods and connections, at $0.08 per pound; earth filling, at $0.30 per cubic yard, measured in bank after settlement; stone filling (9 to 18 cubic feet each), at $2.45 per cubic yard in place; stone filling (¼ to 3 cubic feet each), at $1.95 per cubic yard in place; concrete masonry, at $7.77 per cubic yard in place; extra cement, at $2.50 per barrel, Atlas brand.
Date of approval: November 1, 1907.
Date of beginning: On or before June 1, 1908.
Date of expiration: Two hundred fair working days after commencement.

Name of contractor: Oscar F. Barrett.
Amount and character of work: $27,275. Building dike in Ohio River at Grand Chain, Ill.
Price per unit: Stone, 6 to 10 cubic feet each, at $3.25 per cubic yard; ¼ to 1½ cubic feet each, at $2.70 per cubic yard.
Date of approval: October 24, 1907.
Date of beginning: June 1, 1908.
Date of expiration: Two hundred fair working days after commencement.

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Name of contractor: The Edison Portland Cement Company.
Amount and character of work: $1,391.84. Eight hundred barrels cement canvas sacks delivered at Gallipolis, Ohio.
Price per unit: $1.736 per barrel.
Emergency contract dated November 7, 1907.
Date of beginning: November 12, 1907.
Date of expiration: Two weeks from date of commencement.
Completed.

Name of contractor: Thomas J. McKim.
Amount and character of work: $15,478. Repairing and protecting Great Miami embankment at Lawrenceburg, Ind.
Price per unit: For moving and placing earth fill, at $0.35¼ per cubic yard; for making and placing concrete, at $0.56¼ per square yard.
Date of approval: January 6, 1908.
Date of beginning: May 19, 1908.
Date of expiration: One hundred and fifty fair working days after date of commencement.

Name of contractor: Queen City Marine Railway Company.
Amount and character of work: $240. Rent of storage room.
Price per unit: $20 per month.
Lease dated December 31, 1907.
Date of beginning: January 1, 1908.
Date of expiration: December 31, 1908.

Name of contractor: American Bridge Company of New York.
Amount and character of work: $7,425. Constructing steel flatboat.
Price per unit: $7,425.
Date of approval: January 29, 1908.
Date of beginning: February 3, 1908.
Date of expiration: Twenty-six weeks after date of commencement.

Name of contractor: Kanawha Dock Company.
Amount and character of work: $2,331.43. Towing, docking, and repairing boats.
Price per unit: For towing and docking three dump scows, $275; holding on dock over 12 days, $10 per day; White pine lumber, $45, white oak lumber and oak sheathing, $40 per 1,000 feet B. M.; oakum, $0.10 per pound; red lead, $0.09 per pound; pitch, $0.20 per gallon; boat spikes, $0.04 per pound; nails, assorted, $0.03½ per pound; bolts, $0.05 per pound; services per hour: Foreman, $0.45; carpenters and calkers, $0.35; laborers, $0.25.
For towing and docking dredge *Oswego*, $300; holding on dock over 6 days, $10 per day; assorted rivets, $0.05 per pound; services, per hour: Foreman, $0.45; boiler makers and blacksmiths, $0.40; blacksmith's helpers, $0.25; laborers, $0.25.
Emergency contract dated March 9, 1908.
Date of beginning: March 11, 1908.
Date of expiration: April 18, 1908. Completed.

Name of contractor: Howard Ship Yards Company.
Amount and character of work: $7,859. Building cabin and upper works on steel dredge.
Price per unit: $7,859.
Date of approval: April 3, 1908.
Date of beginning: April 17, 1908.
Date of expiration: July 15, 1908. Completed.

Name of contractor: The Edison Portland Cement Company.
Amount and character of work: $347.50. Cement in paper sacks delivered at Gallipolis, Ohio.
Price per unit: $1.39 per barrel.
Emergency contract dated April 2, 1908.
Date of beginning: Five days after signature of contract.
Date of expiration: Thirty days after commencement. Completed.

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Name of contractor: Kanawha Dock Company.
Amount and character of work: $4,250. Reconstruction of one dump scow.
Price per unit: $4,250.
Emergency contract dated April 7, 1908.
Date of beginning: April 17, 1908.
Date of expiration: Six weeks from date of commencement.

Name of contractor: Thomas F. McCleary and Josephine McCleary.
Amount and character of work: $6,125.45. Hire of towboat as tender to United States dredges during season of 1908.
Price per unit: $38.67 per calendar day above Louisville, Ky.; $41.67 per calendar day below Louisville, Ky.
Date of approval: June 2, 1908.
Date of beginning: June 23. 1908.
Date of expiration: About December 1, 1908.

Name of contractor: H. B. Hulings.
Amount and character of work: $7,718.61. Hire of towboat as tender to United States dredges during season of 1908.
Price per unit: $41.47 per calendar day above Louisville, Ky.; $44.47 per calendar day below Louisville, Ky.
Date of approval: June 13, 1908.
Date of beginning: May 20, 1908, pending approval of contract.
Date of expiration: About December 1, 1908.

STAGES OF OHIO RIVER IN 1907.

The following are the records of the gauges at Pittsburg, Cincinnati, and Evansville, which may be taken to represent the navigable conditions of the upper, middle, and lower Ohio:

Gauge at Davis Island dam, near Pittsburg, Pa.

[When the dam is up, low-water readings must be obtained from the gauge at the lower end of the lock. On this gauge 3 feet 2 inches corresponds to a navigable depth of 8 feet, and 6 feet corresponds to the same depth in the river.]

Month.	Depth in channel.			Gauge readings.	
	Under 3 feet.	3 feet and over.	6 feet and over.	Highest.	Lowest.
1907.	*Days.*	*Days.*	*Days.*	*Feet.*	*Feet.*
January	0	31	31	22.1	6.2
February	0	28	24	12.4	5.7
March	0	31	31	33.7	7.0
April	0	30	30	12.0	6.3
May	0	31	31	12.0	6.5
June	0	30	20	14.0	5.2
July	0	31	19	13.7	4.4
August	0	31	13	9.6	3.4
September	0	30	6	8.9	3.0
October	0	31	24	8.7	4.4
November	0	30	26	12.7	5.5
December	0	31	27	17.4	4.9
Total	0	365	282	.....	.....

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Cincinnati gauge.

[The zero of this gauge is about 2 feet below low water; readings of about 4 feet correspond to about 3 feet in the channel, and those of 7 feet to about 6 feet in the channel.]

Month.	Depth in channel.			Gauge readings.	
	Under 3 feet.	3 feet and over.	6 feet and over.	Highest.	Lowest.
1907.	*Days.*	*Days.*	*Days.*	*Feet.*	*Feet.*
January	0	31	31	65.2	22.0
February	0	28	28	31.4	17.4
March	0	31	31	62.1	22.3
April	0	30	30	30.7	18.5
May	0	31	31	30.9	15.9
June	0	30	30	43.0	14.2
July	0	31	31	27.7	12.2
August	0	31	31	21.9	9.5
September	0	30	30	16.8	8.9
October	0	31	31	17.2	7.0
November	0	30	30	28.9	7.1
December	0	31	31	32.8	10.2
Total	0	365	365	.....	.....

Evansville gauge.

[The zero of this gauge is about at low-water line; readings of 2 feet correspond to about 3 feet in the channel, and readings of 6 feet correspond to about 6 feet in the channel.]

Month.	Depth in channel.			Gauge readings.	
	Under 3 feet.	3 feet and over.	6 feet and over.	Highest.	Lowest.
1907.	*Days.*	*Days.*	*Days.*	*Feet.*	*Feet.*
January	0	31	31	46.2	21.7
February	0	28	28	39.0	14.4
March	0	31	31	43.8	20.5
April	0	30	30	31.1	15.7
May	0	31	31	26.8	13.1
June	0	30	30	32.3	12.6
July	0	31	31	20.0	9.7
August	0	31	31	16.0	7.1
September	0	30	30	13.7	6.9
October	0	31	28	11.8	5.5
November	0	30	28	17.8	5.3
December	0	31	31	24.0	7.3
Total	0	365	360	.....	.....

STAGES OF THE OHIO RIVER.

Highest, lowest, and average stages of the Ohio River at Cincinnati each calendar year from 1860 to 1907, inclusive, with the highest stage during the floods of 1832 and 1847.

Calendar year.	Highest stage.		Lowest stage.		Average for the year.
	Date.	Stage.	Date.	Stage.	
		Feet.		*Feet.*	*Feet.*
1832	Feb. 18	64.2	.....	.....	.....
1847	Dec. 17	63.6	.....	.....	.....
1860	Apr. 16	49.2	Oct. 3	5.3	16.0
1861	Apr. 19	49.4	July 13	5.1	19.1
1862	Jan. 24	57.3	Oct. 31	2.3	17.4
1863	Mar. 12	42.7	Oct. 6	2.5	15.0
1864	Dec. 23	45.1	Aug. 6	3.1	16.7
1865	Mar. 7	56.2	Oct. 19	5.7	21.8
1866	Sept. 26	42.5	Aug. 17	4.7	19.2
1867	Mar. 14	55.7	Oct. 19	3.0	17.0
1868	Mar. 30	48.2	July 21	5.1	18.7
1869	Apr. 2	48.7	Aug. 21	5.3	19.7

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Highest, lowest, and average stages of the Ohio River at Cincinnati each calendar year from 1860 to 1907, etc.—Continued.

Calendar year.	Highest stage.		Lowest stage.		Average for the year.
	Date.	Stage.	Date.	Stage.	
		Feet.		Feet.	Feet.
1870	Jan. 19	55.2	Oct. 4	3.8	17.8
1871	May 13	40.5	Oct. 12	2.7	11.8
1872	Apr. 13	41.7	Oct. 14	3.0	11.7
1873	Dec. 18	44.4	Oct. 12	3.7	18.4
1874	Jan. 11	47.9	Sept. 22	2.3	15.7
1875	Aug. 6	55.3	Sept. 19	4.2	18.7
1876	Jan. 29	51.7	Sept. 4	6.2	18.2
1877	Jan. 20	58.7	Oct. 9	3.2	15.0
1878	Dec. 15	41.3	Oct. 24	4.3	16.7
1879	Dec. 27	42.7	Oct. 23	2.5	14.5
1880	Feb. 17	53.1	Oct. 28	3.7	17.0
1881	Feb. 16	50.6	Sept. 18	1.9	16.9
1882	Feb. 21	58.6	Nov. 1	6.1	a22.1
1883	Feb. 15	66.3	Sept. 21	3.6	a19.5
1884	Feb. 14	71.0	.....do	2.7	a17.3
1885	Jan. 20	46.0	Sept. 26	2.5	a15.6
1886	Apr. 9	55.7	Nov. 1	3.3	a17.8
1887	Feb. 5	56.2	Sept. 23	2.7	a15.1
1888	Apr. 1	39.9	Aug. 7	5.2	a17.9
1889	Feb. 22	38.2	Sept. 13	5.2	a18.5
1890	Mar. 26	59.2	Aug. 30	5.7	a25.7
1891	Feb. 25	57.3	Oct. 7	4.4	a20.5
1892	Apr. 25	43.7	Nov. 5	3.4	a16.5
1893	Feb. 20	54.9	Aug. 30	3.6	a17.7
1894	Feb. 15	35.6	Sept. 14	3.1	a12.9
1895	Jan. 14	48.4	Oct. 28	2.3	a12.2
1896	Apr. 4	47.8	Sept. 25	5.5	a16.7
1897	Feb. 26	61.2	Oct. 18	3.1	a16.5
1898	Mar. 29	61.4	Oct. 6	4.5	a19.7
1899	Mar. 8	57.4	Nov. 2	3.4	17.1
1900	Dec. 1	40.0	Oct. 21	3.2	13.8
1901	Apr. 26	59.7	Nov. 11	4.2	17.6
1902	Mar. 5	50.9	Sept. 24–25	3.9	16.8
1903	.....do	58.1	Oct. 7, Nov. 11–16	4.5	17.9
1904	Mar. 9	45.9	Oct. 6–7	3.3	14.6
1905	May 16	48.2	.....do	6.5	18.2
1906	Apr. 2	50.2	Sept. 22	7.1	17.7
1907	Jan. 21 Mar. 19	65.2 62.1	Oct. 31	7.0	22.7

a Prepared from the stages as shown by the waterworks marks daily at 6 a. m. and 6 p. m., the previous and succeeding years having been made from one daily observation at 6 a. m.

MONTHLY COMPARISONS OF RIVER AND RAINFALL.

Highest, lowest, and average monthly stages of the Ohio River, and monthly and annual rainfall at Cincinnati, in two years ending December 31, 1906 and 1907.

Month.	Highest.				Lowest.				Average.		Rainfall.	
	1907.		1906.		1907.		1906.		1907.	1906.	1907.	1906.
	Date.	Feet.	Date.	Feet.	Date.	Feet.	Date.	Feet.	Feet.	Feet.	Inches.	Inches.
January	21	65.2	28	35.0	31	22.0	3	17.2	45.7	26.7	3.40	3.25
February	6	31.4	1	26.1	28	17.4	18	9.5	22.1	13.9	.76	1.68
March	19	62.1	31	44.8	1	22.3	1	15.8	40.1	26.3	3.43	6.03
April	30	30.7	2	50.2	8	20.5	29	16.1	28.9	30.3	3.68	1.20
May	1	30.9	2	21.3	24	15.9	29	9.2	22.4	14.2	2.49	1.10
June	17	43.0	14	16.8	30	14.2	3	9.1	27.2	12.5	3.87	5.62
July	28	27.7	25	14.7	7	13.2	17–18	7.3	18.3	10.1	5.59	6.60
August	1	21.9	17	20.2	9	9.5	9–10	9.0	13.5	14.3	2.93	3.78
September	15	16.8	4	15.3	10	9.9	22	7.1	12.1	10.1	1.20	3.90
October	12	17.2	24	19.5	31	7.0	1	10.2	10.6	13.3	2.86	1.06
November	15	23.9	23	33.5	1	7.1	16	8.2	17.0	15.7	1.97	3.04
December	29	32.3	21	33.3	13	10.2	9	11.0	19.4	23.3	2.33	3.57
The year	a21	65.2	b2	50.2	c31	7.0	d22	7.1	22.7	17.7	44.56	40.33

a January. b April. c October. d September.

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LOSSES BY COLLISION WITH BRIDGES.

The following table shows the reported losses sustained by the commerce of the Ohio River by collision with the piers of bridges crossing the Ohio River to the end of the calendar year 1907:

Date, etc.	Owner.	Steamboat.	Loss.	Amount.
Louisville and Jeffersonville bridge:				
Previously reported				$7,800.00
January 13, 1907	Louisville and Jeffersonville Bridge Co.	W. C. Hite.	Steamer damaged.	200.00
Total				8,000.00

NOTE.—The above loss was reported by the owners.

LOSSES BY COLLISION WITH OHIO RIVER BRIDGES TO DECEMBER 31, 1907.

Ohio Connecting Railway bridge	$3,500.00
Beaver bridge	91,140.00
East Liverpool bridge	8,500.00
Steubenville bridge	140,758.00
Wheeling and Martins Ferry bridge	12,150.00
Bellaire bridge	150,126.00
Parkersburg bridge	115,248.47
Point Pleasant bridge	9,650.00
Kenova bridge	77,950.00
Ashland and Ironton bridge	8,000.00
Newport and Cincinnati railway and highway bridge	48,107.00
Newport and Cincinnati highway bridge	750.00
Covington and Cincinnati railroad bridge	108,200.00
Cincinnati Southern bridge	14,812.00
Louisville and Jeffersonville bridge	8,000.00
Ohio Falls bridge	207,600.00
Kentucky and Indiana bridge	34,267.00
Henderson bridge	40,660.00
Cairo bridge	41,169.95
Total	1,115,588.42

COMMERCIAL STATISTICS.

Commerce of Ohio River in 1907.

[Compiled from reports made by owners, agents, and masters of vessels and transportation companies, in compliance with act of Congress approved February 21, 1891—Public No. 92.]

Name of boat or company.	Terminal points.	Distance.	In commission.	Freight.	Passengers.
		Miles.	*Months.*	*Tons.*	
The Monongahela River Consolidated Coal and Coke Co.	Pittsburg to Cairo	965.0	12.0	1,252,069	
	Pittsburg to Louisville	598.0	12.0	567,151	
	Pittsburg to Cincinnati	468.4	12.0	697,067	
West Kentucky Coal Co	Pittsburg to Cairo	965.0	12.0	196,468	
C. Jutte & Co	do	965.0	12.0	290,500	
The A. R. Budd Coal Co	Pittsburg to Louisville	598.0	12.0	90,000	
Diamond Coal and Coke Co.	Pittsburg to Cincinnati	468.4	12.0	60,000	
Steamer Keystone State	do	468.4	7.0	8,650	5,[illegible]
Steamer Queen City	do	468.4	4.0	12,275	7,[illegible]
Steamer Virginia	do	468.4	8.0	20,200	16,[illegible]
United Coal Co	do	468.4	9.0	86,404	
Green Packet Co	do	468.4	12.0	37,472	10,[illegible]
Steamer Darling	do	468.4	7.3	26,102	
Steamer Cricket	do	468.4	12.0	37,500	[illegible]

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Commerce of Ohio River in 1907—Continued.

Name of boat or company.	Terminal points.	Distance.	In commission.	Freight.	Passengers.
		Miles.	*Months.*	*Tons.*	
Steamer Kanawha	Pittsburg to Gallipolis	269.1	12.0	6,825	8,125
Steamer Avalon	Pittsburg to Point Pleasant	264.5	8.0	3,600	920
Steamer Ben Hur	Pittsburg to Parkersburg	184.1	8.0	48,000	7,000
Steamer H. K. Bedford	Pittsburg to Parkersburg	184.1	10.0	17,000	18,000
Steamer Lorena	Pittsburg to Marietta	171.3	7.0	6,500	3,000
Steamer Shifter	....do	171.3	9.0	700	300
Sharpsburg Sand Co	Pittsburg to Dam No. 4	18.6	12.0	297,313	.....
Clyde Coal Co	....do	18.6	12.0	6,271	.....
John F. Klein	Pittsburg to Coney Island Park	8.1	7.0	.....	118,440
Steamer Short Cut	Pittsburg to Allegheny	1.0	12.0	20,109	74,800
Steamer Steel Queen	Allegheny to Bellevue	4.5	12.0	7,168	169,047
Steamer Pirate	Rochester to Parkersburg	159.3	2.0	70	321
Coney Island Co	East Liverpool to Cairo	921.3	2.0	82	91,556
Steamer Clermond	Wellsville to Louisville	550.9	5.5	540	.....
Steamer Crusoe	Wellsville to Congo	1.0	12.0	120,000	30,000
Steamers West End and Buckeye.	Wellsburg to Brilliant	1.0	12.0	1,360	46,000
Steamer Beaver	Wheeling to Parkersburg	94.0	11.0	10,000	11,000
Steamer Bessie Smith	....do	94.0	11.5	12,500	5,450
Steamer Ruth	Wheeling to New Matamoras	51.8	6.0	10,000	6,111
Steamer Royal	Wheeling to Clarington	27.5	11.0	550	12,534
Steamer Buckeye	Wheeling to West Wheeling	1.0	10.5	6,300	24,795
Steamer Monator	....do	1.0	9.0	66,809	.....
Armstrong Sand Co	Bellaire to Moundsville	7.7	8.5	31,000	.....
Steamer Charon	Bellaire to Benwood	1.0	12.0	.....	356,229
Steamer Leroy	Sistersville to Marietta	33.8	4.0	4,576	7,260
Steamer Jewell	....do	33.8	6.0	6,864	10,890
Steamer Orion	Sistersville to Tuels Landing	1.0	10.0	4,500	30,000
Steamer Melia A	New Matamoras to Friendly	1.0	12.0	145	31,000
Steamer Valley Belle	Marietta to Middleport	79.7	10.0	8,400	14,637
Steamer French	Parkersburg to Cincinnati	284.3	8.0	10,000	50
Steamer W. O. Hughart	Parkersburg to Point Pleasant	80.4	10.0	392,842	5,228
Steamer Katydid	Parkersburg to Reedville	18.8	8.0	768	2,880
Steamer Rayman	....do	18.8	12.0	2,344	3,790
Steamer Nina Paden	Parkersburg to Belpre	1.0	12.0	52,000	289,908
Steamer W. O. Hughart	Racine to Graham	1.0	2.0	200	2,118
Steamer Klondike	Syracuse to Gallipolis	24.1	11.0	450	1,140
Steamer Katie Mc	Pomeroy to Cairo	715.5	4.0	12,000	.....
Ohio Valley Towing Co	Pomeroy to Joppa	686.5	8.0	49,600	.....
Steamer Convoy	Pomery to Louisville	348.5	12.0	58,240	.....
Steamer Douglas Hall	....do	348.5	12.0	150,000	.....
The E. J. Hickey Transportation Co.	....do	348.5	12.0	248,226	.....
Steamer Ada V	Pomeroy to Aurora	245.3	4.0	3,900	.....
Cincinnati, Pomery & Charleston Packet Co.	Pomeroy to Cincinnati	218.9	12.0	72,304	40,480
Steamer Champion No. 3	Pomeroy to Mason City	1.0	12.0	1,000	54,350
Steamer Mountain Queen	Point Pleasant to Louisville	333.5	12.0	1,000	.....
The Campbell Creek Coal Co.	....do	333.5	12.0	328,171	.....
Steamer Otto Marmet	Point Pleasant to Carrollton	276.5	12.0	94,135	.....
Steamer Sallie Marmet	....do	276.5	12.0	82,251	.....
The Marmet Coal Co	Point Pleasant to Cincinnati	203.9	9.0	185,076	.....
Steamer Winifrede	....do	203.9	9.0	56,040	.....
Steamer J. B. Lewis	....do	203.9	7.0	71,352	.....
Steamer Gondola	Point Pleasant to Gallipolis	4.6	10.0	625	169
Steamer Neva	....do	4.6	10.0	1,250	3,500
Steamer Eclipse	....do	4.6	5.0	400	7,350
Steamer Boone No. 4	Point Pleasant to Kanauga	1.0	12.0	3,700	10,876
Steamer Thealka	Gallipolis to Ironton	57.6	6.0	1,740	250
Steamer Oriole	Gallipolis to Huntington	38.7	1.0	173	1,350
Steamer Carrie Brown	....do	38.7	11.5	14,220	13,612
Steamer Francis	Gallipolis to Poplar Grove	1.0	12.0	8,777	4,601
Steamer Greyhound	Proctorville to Portsmouth	51.1	12.0	9,000	25,270
Steamer Arion	Proctorville to Guyandotte	1.0	11.0	43,000	118,750
Steamer Sea Lion	Guyandotte to Louisville	293.4	10.0	180,000	.....
C. Crane & Co	Guyandotte to Cincinnati	163.8	12.0	185,000	.....
Island Creek Fuel Co	Huntington to Cincinnati	160.6	12.0	394,842	.....
Steamer Sunshine	....do	160.6	3.0	.....	10,000
Steamer Leni Leoti	Huntington to Maysville	99.6	9.0	41,250	.....
Steamer City of Huntington.	Huntington to Rockwood	1.0	12.0	.....	51,509
Steamer Central City	Central City to opposite shore	1.0	7.0	2,100	21,600
Steamer Emma Marie	Catlettsburg to Cincinnati	151.7	2.0	5,800	.....
Steamer Bonne	Catlettsburg to South Point	1.0	12.0	345	11,227
Steamer Mountain State	Ashland to Carrollton	219.0	10.0	5,400	.....
Steamer Dan Patch	Ashland to Cincinnati	146.4	10.0	4,495	.....
Steamer Wenona	Ashland to Coal Grove	1.0	12.0	.....	297,585
Steamer J. M. Bowell	Ironton to Quincy	39.3	.5	150,000	.....
Steamer Bob Ballard	Ironton to Ashland	5.0	12.0	700,809	.....

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Commerce of Ohio River in 1907—Continued.

Name of boat or company.	Terminal points.	Distance.	In commission.	Freight.	Passengers.
		Miles.	*Months.*	*Tons.*	
Steamer Ironton	Ironton to Russell,	1.0	12.0	48,960	169,[illegible]
John Barrett & Son	Portsmouth to Cairo	609.8	12.0	37,000	
Sheridan-Kirk Contract Co	Portsmouth to Paducah	564.8	8.0	27,080	
Steamer Emily	Portsmouth to Fullerton	1.0	12.0	10,950	71,[illegible]
Steamer Chesapeake	Portsmouth to South Portsmouth	1.0	12.0	13,587	132,[illegible]
Steamer W. H. Whiteman	Manchester to South Manchester	1.0	11.0	8,250	35,[illegible]
Steamer Alert	Maysville to Madison	145.6	12.0	190,930	
Steamer Laurance	Maysville to Aberdeen	1.0	12.0	3,200	33,[illegible]
Steamer Proctor K. Smiley	Ripley to South Ripley	1.0	12.0	7,162	68,[illegible]
Steamer Whisper	Augusta to Bonds Ferry	1.0	12.0	1,031	8,[illegible]
Steamer New Richmond	New Richmond, Ohio, to New Richmond, Ky.	1.0	12.0	12,050	28,[illegible]
B. J. Riggs	Blairsville to Cincinnati	16.4	9.0	51,000	
Coney Island Co	Coney Island to Cincinnati	8.5	8.4	735	588,[illegible]
J. R. Ware & Son	Coney Island to Fernbank	21.8	12.0	194,585	
The Smith Sand Co	Dayton to Addyston	16.5	11.0	49,157	
Lee Line	Cincinnati to Cairo	496.6	7.0	16,968	4,[illegible]
Steamer Martha H. Hennen.	Cincinnati to Paducah	451.6	6.0	4,000	
Steamer E. T. Slider	Cincinnati to Evansville	314.6	12.0	238,000	
Steamer Blue Wing	Cincinnati to Louisville	129.6	12.0	7,200	
Steamer Geo. Matheson No. 2.	.....do	129.6	8.0	125,120	
Louisville and Cincinnati Packet Co.	.....do	129.6	12.0	177,273	121,[illegible]
Steamer Levi J. Workum	.....do	129.6	5.6	10,861	1,[illegible]
Steamer Bonanza	.....do	129.6	4.3	10,256	4,[illegible]
Steamer Kentucky	Cincinnati to Madison	84.6	.4	974	177
Steamer Boone No. 5	Cincinnati to Constance	1.0	12.0	28,000	22,[illegible]
Steamer J. M. Grubbs	Cincinnati Harbor	6.0	8.0	80,000	
Steamer Charlotte Boeckler.	Lawrenceburg to Cairo	473.9	4.0	4,200	
Steamer Pauline	Lawrenceburg to Aurora	3.7	12.0	6,008	14,[illegible]
Steamer Swan	Aurora to Patriot	19.7	12.0	1,269	15,[illegible]
Steamer Raymond	Vevay to Louisville	65.0	8.0	8,000	
Steamer Eva Everett	Vevay to Ghent	1.0	12.0	50,000	12,[illegible]
Louisville and Jeffersonville Ferry Co.	Carrollton to Louisville	57.0	12.0		503,[illegible]
Steamer Lucile	Carrollton to Louisville	57.0	12.0	7,090	
Steamer Falls City	.....do	57.0	9.0	14,400	7,[illegible]
Steamer Donca	.....do	57.0	6.0	2,000	2,[illegible]
Steamer Aly. Gray	Carrollton to Madison	14.0	8.5	8,794	
Steamer White Dove	.....do	14.0	11.0	3,000	2,[illegible]
Kentucky and Indiana Ferry Co.	Milton to Madison	1.0	12.0	21,560	43,[illegible]
Steamer Hiawatha	Madison to Cannelton	164.0	6.0		70,[illegible]
Steamer Hanover	Madison to Westport	23.7	12.0	2,537	6,[illegible]
Steamer Wm. Duffy	Twelve Mile Island to Louisville	12.0	12.0	228,000	
Steamer Concrete	Louisville to Cairo	367.0	7.0	2,000	
Louisville and Evansville Packet Co.	Louisville to Evansville	185.0	12.0	255,365	18,[illegible]
Steamer Little Willie	.....do	185.0	12.0	13,517	
Steamer Alma	.....do	185.0	10.0	30,130	
Steamer Gazelle	Cannelton to Owensboro	82.0	10.0	7,035	5,[illegible]
Steamer Major	Cannelton to Hawesville	1.0	12.0	1,008	22,[illegible]
John Archbold Coal Co	Owensboro to Cairo	216.0	12.0	53,596	
Robert Hornbrook	Owensboro to Cave-in-Rock	120.0	10.0	40,000	35,[illegible]
Green River Coal Co	Owensboro to Mount Vernon	70.5	11.0	15,897	
Steamer Francis	Owensboro to Evansville	84.0	6.0	82,460	2,[illegible]
Steamer Newburg	Newburg to Hosmans Landing	1.0	12.0	1,000	10,[illegible]
Steamer Neptune	Green River to Smithland	132.5	9.0	18,000	
Steamer Alfred D. Owen	Green River to Wabash Island	65.0	12.0	5,598	
Steamer Sunbeam	Green River to Evansville	8.0	10.0	32,979	
Steamer Samuel	.....do	8.0	10.0	22,500	
Steamer We Three	.....do	8.0	11.3	2,000	[illegible]
Steamer Norway	.....do	8.0	12.0	534	6,[illegible]
Steamer Little Clyde	.....do	8.0	4.0	9,000	
Steamer Kenois	.....do	8.0	1.0	1,000	
Green River Towing Co	.....do	8.0	4.0	65,000	
Steamer Alice L. Barr	.....do	8.0	10.0	108,567	
Evansville and Bowling Green Packet Co.	.....do	8.0	12.0	41,490	20,[illegible]
Steamer J. M. Bowell	.....do	8.0	6.0	19,200	
Steamer Mabel	.....do	8.0	3.0	4,800	
Steamer Penguin	.....do	8.0	11.0	19,800	
Steamer Enos Taylor	Evansville to Cairo	182.0	12.0	25,075	
Steamer John S. Hopkins	Evansville to Paducah	137.0	11.0	17,120	13,[illegible]
Steamer Joe Fowler	.....do	137.0	10.0	15,675	14,[illegible]
Steamer J. B. Richardson	Evansville to Smithland	125.0	6.0	8,742	2,[illegible]
Steamer New Haven	Evansville to Golconda	107.2	10.0	200	

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Commerce of Ohio River in 1907—Continued.

Name of boat or company.	Terminal points.	Distance.	In commission.	Freight.	Passengers.
		Miles.	*Months.*	*Tons.*	
Steamer Annie L	Evansville to Caseyville	77.5	6.0	1,742	
Steamer Little Wabash	Evansville to Shawneetown	65.0	6.0	520	
Steamer Jewel	Evansville to Henderson	11.0	12.0	5,142	35,180
Steamer Georgia	Shawneetown to Blackburn	1.0	9.0	150	12,242
Steamer Nellie	Mouth Saline River to Cairo	108.0	7.0	70,395	
Ayer & Lord Tie Co	do	108.0	12.0	261,670	
Steamer Nellie Brown	Dekoven to Paducah	61.0	12.0	87,292	
Steamer Mary M. Michael	Cave-in-Rock to Cairo	96.0	8.0	8,050	
Steamer Bernice	Fairview Landing to Golconda	12.0	12.0	20,454	
Steamer Royal	Golconda to Paducah	30.0	12.0	9,300	26,262
Steamer John S. Summers	Smithland to Cairo	57.0	12.0	44,300	
Steamer Charles Turner	Smithland to Joppa	28.0	11.0	59,600	
Holcomb-Hayes Co	Smithland to Joppa	28.0	12.0	70,232	
Steamer H. W. Buttorff	Smithland to Paducah	12.0	6.0	1,630	1,850
Steamer Henrietta	Paducah to Cairo	45.0	12.0	57,173	
St. Louis and Tennessee River Packet Co.	do	45.0	12.0	74,474	14,290
Steamer Scotia	do	45.0	12.0	28,992	
Steamer Dick Fowler	do	45.0	10.0	21,908	36,841
Steamer I. N. Hook	Paducah to Joppa	16.0	1.0	4,273	
Steamer George Cowling	Paducah to Metropolis	9.0	12.0	7,226	51,181
Illinois Central Railroad Co.	Paducah to Brookport	3.0	12.0	108,858	22,169
Steamer Bettie Owen	do	3.0	10.0	60,000	15,000
Steamer Oscar F. Keeler	Mound City and vicinity	2.0	8.0	24,000	
Total				11,306,544	4,414,213

E E 2.

CONSTRUCTION OF LOCK AND DAM NO. 37, OHIO RIVER.

The general project for this work is printed in House Document No. 336, Fifty-seventh Congress, first session, and was adopted by Congress in the river and harbor act of June 13, 1902, by appropriating $100,000 for commencing operations and authorizing their completion under the continuing contract system, at a total cost not exceeding $1,050,000. The river and harbor act of March 2, 1907, authorized the expenditure of $100,000 in excess of amounts heretofore appropriated or authorized: "*Provided*, That the said lock and dam shall be constructed with a view to a navigable depth of nine feet."

A description of preliminary work in connection with the construction of the lock and dam is given in reports of the Chief of Engineers for 1903, Appendix F F 2, page 1645, and 1904, Appendix D D, pages 2428 to 2430, inclusive. Statements of actual construction are given in reports of the Chief of Engineers as follows: 1905, Appendix D D, pages 1816 to 1819, inclusive; 1906, Appendix E E, pages 1564 to 1567, inclusive, and 1907, Appendix E E 2, pages 1670 to 1673, inclusive.

The work is being carried on under contract with the Sheridan-Kirk Contract Company, dated October 27, and approved November 17, 1904.

OPERATIONS FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

River conditions.—Pumping out the cofferdams inclosing the lock and upper guide wall, which had been in progress since June 27, was interrupted by a freshet on July 2 and again on the 8th, and it was

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not until July 10 that the cofferdam was pumped out. Another rise in river occurred on the 12th, and the dam remained flooded until August 10, when active work in the river was resumed. Work was stopped by freshet on August 26, causing a suspension of work until September 5; high water on the 15th occasioned a loss of two days (September 16 and 17). Work was interrupted for three days during the month of October by a freshet on the 12th. In the month of November the cofferdams were flooded on the 6th and work was not resumed until the 20th; a second rise stopped the work on the 26th for the remainder of that month. The water in lock coffer was pumped out sufficiently by December 5 to allow contractors to resume work in the river; this coffer was again flooded on December 15 and work in the river was closed for the season.

The river had receded sufficiently by June 11, 1908, to enable contractors to begin pumping out the cofferdams, and on June 19 the cofferdams were pumped out and work in the river resumed.

Total fair working days charged to contractors from July 1, 1907, to June 30, 1908, 61½.

Cofferdam.—The construction of the section of cofferdam inclosing the permanent dam across the river was begun June 18, 1908, and at the close of the fiscal year 98 piles had been driven in the upstream arm of this cofferdam and the top stringers secured to the piles driven.

Temporary piling.—In connection with the protection of navigable pass cofferdam, the following piles were driven during the fiscal year:

Temporary piling	number	24

Crib timbers.—Nine cribs 16 by 16 feet, built of 8 by 10 inch yellow-pine timbers, were placed in protection line of navigable pass cofferdam, the following timber being used in their construction:

Crib timbers	feet B. M.	102,186

Clearing land.—The land on Ohio shore back of the lock and gate recesses has been cleared of trees, stumps, etc., from 600 feet above to 900 feet below axis of dam, a total of 2.7 acres having been cleared and paid for during the fiscal year.

Ordinary excavation.—The ordinary excavation during the year embraced the completion of the excavation for foundations of lock walls, upper gate recess, and upper gate track; excavation for a section of the upper guide wall foundation was also completed.

This work was carried on by hand labor in connection with steam derricks, cableways, and tram cars.

The above work included 156 linear feet of the land and river walls of lock, 19 linear feet of the upper guide wall, the entire foundation of upper gate recess and upper gate track. The following material was removed and paid for during fiscal year:

Ordinary excavation	cubic yards	6,143

Deposit excavation.—The following material deposited in the cofferdam inclosures during periods of high water was removed by contractors during fiscal year from the lock walls, upper and lower gate recesses and gate-track foundations, and upper guide wall foundation:

Deposit excavation	cubic yards	12,171

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Rock excavation.—All rock excavation required for the completion of the foundations of the lock walls, upper gate recess, and upper gate track was finished during the fiscal year. The following quantity was removed and paid for:

Rock excavation	cubic yards	307

Ordinary filling.—Material excavated during the working season for foundations was used for filling back of land wall of lock and around upper and lower gate recesses. A considerable amount of filling was also done during the winter months with material excavated by dredges from lock chamber and along the Kentucky shore below the dam site, the area back of land wall and around gate recesses being filled to required elevation. Work of filling the terrace on top of bank, about the foundations of permanent buildings, with material excavated from lower gate recess and lock chamber during the month of June, 1908, has also been in progress. The following quantity of ordinary filling was placed during the fiscal year:

Ordinary filling	cubic yards	22,444

Stone filling.—The following stone filling was used during fiscal year in the construction of timber protection cribs (filled with stone) and in blind drains in rear of land wall of lock:

Stone filling	cubic yards	2,306

Concrete masonry.—The masonry of upper gate recess, both foundation and superstructure, and the concrete foundation of upper gate track was entirely completed during the fiscal year; 76 linear feet of the concrete foundation of land wall and 186 linear feet of the foundation of river wall of lock was also placed during fiscal year, completing the lock wall foundations; 19 linear feet of the foundation of upper guide wall at downstream end was completed.

Five monoliths of the superstructure of the land wall of lock, having a length of 261.34 linear feet, were placed during fiscal year, entirely completing the masonry of land wall of lock.

Total concrete placed during fiscal year was as follows:

Concrete masonry	cubic yards	11,314

To complete the entire masonry of the lock and approaches there remains to be placed the following concrete:

Upper guide wall foundation	linear feet	130
Upper guide wall superstructure (4 monoliths)	do	166
River lock wall superstructure (12 monoliths)	do	562
Total	do	858

A total of 11,910¼ barrels of cement (furnished by the United States) were used in the concrete placed during the fiscal year.

Manholes.—Two manholes, built in connection with the main sewer near outlet through lower guide wall, were completed by being supplied with their cast-iron cover plates.

Timber.—The oak sill of upper Poiree dam was completed and secured in place; work of making the wickets for the navigable pass was begun after the suspension of active operations, and at the close of the fiscal year a total of 190 of the 225 wickets required were completed and fitted with their iron and steel parts, ready to place in the work.

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The battens for upper Poiree dam, made of white pine, were completed and stored on the site.

The stringer and needles of upper Poiree dam, made of yellow pine, were also completed and stored on the site.

The following timber was used in the construction of the items enumerated above:

Oak timber	feet B. M.	133,
Pine timber, white	do	1,
Cypress timber	do	1,
Yellow-pine timber	do	7,

A portion of the timber for the lock gates and for the needles and battens of lower Poiree dam was prepared by contractors and stored on the site; partial payment was made on this timber, in accordance with paragraph 48 of the specifications, as follows:

Oak timber	feet B. M.	4,
Pine timber, white	do	7,
Yellow-pine timber	do	13,

Iron and steel work.—The iron and steel placed in position in the permanent work during the fiscal year embraced the tracks and pedestals for movement of upper lock gate; valves and valve chambers for flushing conduit in upper recess; trestles, trestle boxes, and sockets of upper Poiree dam; curbing for pump well in upper recess; check posts and ladders in lock walls and gate recess; I beams and cast-iron cover plates forming the covering of upper gate recess; the wrought-iron handle and tie plates, cast-iron breech weights, and cast-steel wicket boxes for navigable pass wickets; all secured in place with the necessary anchor plates, anchor bolts, washers, spikes, and rivets.

Following is a statement of the ironwork placed and finally paid for during the fiscal year:

Cast iron	pounds	184,
Wrought iron and steel	do	187,
Steel castings	do	28,

During the fiscal year 218,118 pounds of wrought iron and steel, for use in the permanent work, was delivered at the site and partial payment made on same.

The ironwork for the bear traps and additional ironwork required in modification of lower lock gate will be furnished under supplemental contracts dated June 22 and August 28, 1907, respectively.

Work of assembling and erecting in place the metal work of upper lock gate, which had been stopped by high water in December, was resumed June 15, 1908, by the subcontractor for this work, and at the close of the fiscal year the metal work of this gate was completed, except a small amount of riveting and painting.

Lowering gate tracks, etc.—Under supplemental contract dated August 28, approved September 7, 1907, for lowering the lower gate tracks and Poiree dam foundation and raising top of lower lock gate, the contractors began the removal of the concrete in gate track by means of steam channeler, steam drills, wedges, bars, etc., after first taking up the gate tracks and removing the I beams and cover plates from top of lower gate recess. The following concrete was removed in connection with this work:

Concrete removed	cubic yards	177

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Cement.—All cement used in the work has been furnished by the Atlas Portland Cement Company, under contract dated April 7, approved April 15, 1905; during the fiscal year 10,699½ barrels of cement were delivered under this contract.

Laboratory tests of all cement used in the work are made at the site.

Since the beginning of the work the average quantity of cement used to 1 cubic yard of concrete has been 1.04 barrels.

Acquisition of land.—By authority of the Secretary of War an additional tract of land, containing 10 acres, was secured adjoining that already owned by the United States on the bank of the Ohio River below the Kentucky abutment.

This land was secured in order to control and protect such portion of the river bank as might become subject to scour from the operation of bear traps.

Summary.—Following is a summary of the work done by contractors during the fiscal year ending June 30:

Temporary piling	number	24
Crib timbers	feet B. M.	102,186
Clearing land	acres	2.7
Ordinary excavation	cubic yards	6,148
Deposit excavation	do	12,171
Rock excavation	do	307
Ordinary filling	do	22,444
Stone filling	do	2,306
Concrete masonry	do	11,314
Manholes	number	2
Oak timber	feet B. M.	138,455
Oak timber delivered and paid for under paragraph 48 of specifications	feet B. M.	4,494
Pine timber, white	do	1,766
Pine timber, white, delivered and paid for under paragraph 48 of specifications	feet B. M.	7,976
Yellow-pine timber	do	7,752
Yellow-pine timber delivered and paid for under paragraph 48 of specifications	feet B. M.	13,931
Cypress timber	do	1,752
Cast iron	pounds	184,507
Wrought iron and steel	do	187,078
Steel castings	do	28,548
Ironwork delivered and paid for under paragraph 48 of specifications	pounds	218,118
Lowering gate tracks, etc.: Removing concrete masonry	cubic yards	177

Money statement.

July 1, 1907, balance unexpended	$493,348.48
Amount appropriated by sundry civil act approved May 27, 1908	100,000.00
	593,348.48
June 30, 1908, amount expended during fiscal year for works of improvement	123,856.35
July 1, 1908, balance unexpended	469,492.13
July 1, 1908, outstanding liabilities	2,256.80
July 1, 1908, balance available	467,235.33
July 1, 1908, amount covered by uncompleted contracts	505,926.15
Amount (estimated) required for completion of existing project	230,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	230,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

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APPROPRIATIONS.

June 13, 1902	$100,000
March 3, 1903	400,000
March 3, 1905	50,000
March 4, 1907	270,000
May 27, 1908	100,000
Total	920,000

CONTRACTS IN FORCE.

Name of contractor: Sheridan-Kirk Contract Company.

Amount and character of work: $796,152.70; construction of Lock and Dam No. 37, Ohio River.

Price per unit, original contract: Cofferdam 14 feet wide, $19.41 per linear foot; cofferdam 18 feet wide, $20.45 per linear foot; cofferdam 20 feet wide, $21.68 per linear foot; temporary piling, $15 per pile; crib timbers, $42 per 1,000 feet B. M.; clearing land, $150 per acre; ordinary excavation, $0.50 per cubic yard; deposit excavation, $0.65 per cubic yard; rock excavation, $2 per cubic yard; channel dredging, $0.10 per cubic yard; ordinary filling, $0.30 per cubic yard; stone filling, $2.50 per cubic yard; slope walls (dry stone), $3 per cubic yard; concrete masonry,[a] $4.29 per cubic yard; brick paving,[a] $1.34 per square yard; roadways, $1.20 per square yard; combination gutter curb,[a] $1 per linear foot; open gutters,[a] $0.70 per linear foot; catch basins,[a] $30 each; manholes,[a] $60 each; sewers,[a] $1.20 per linear foot; oak timber, $72 per 1,000 feet B. M.; pine timber, white, $80 per 1,000 feet B. M.; cast iron, $0.045 per pound; wrought iron and steel, $0.06 per pound; steel castings, $0.09 per pound; bronze, $0.21 per pound; Babbitt metal, $0.15 per pound; yellow-pine timber, $54 per 1,000 feet B. M.; iron pipe, 3-inch diameter, $0.24 per linear foot; iron pipe, 4-inch diameter, $0.40 per linear foot; iron pipe, 6-inch diameter, $0.56 per linear foot; iron pipe, 8-inch diameter, $1.50 per linear foot; valves, 4-inch, $4.50 each; crosses, 4-inch, $1.75 each; tees, 4-inch, $0.70 each; elbows, 4-inch, $0.45 each; brass pipe, $0.40 per pound. Supplemental contracts: Cofferdam, $15 per linear foot; piles, $12.50 each; stone, $2.50 per cubic yard; wrought iron and steel, steel castings, cast iron (weights, blocks, and anchors), cast iron (air pipes, flanges, faced), and steel springs, $0.0785 per pound; bronze (nuts, plugs, and bushings), brass pipes (cast), copper (gaskets, for joints), Babbitt metal (packing rings), $0.60 per pound; 4-inch gate valves (iron, brass mounted), $6.80 each; 6-inch wrought-iron pipe, $0.95 per linear foot; 4-inch wrought-iron pipe, $0.63 per linear foot; 4-inch elbows (screw ends), $1.48 each; 4-inch recessed couplings, $1.28 each; cutting and threading bolts, $0.15 each; white-oak timber (dressed and fitted), $72 per 1,000 feet B. M.; white-pine timber (dressed and fitted), $80 per 1,000 feet B. M.; removing and replacing gate tracks, cover plates, and I beams, $835; removing concrete masonry, $10.50 per cubic yard; rock excavation, $5 per cubic yard; replacing concrete masonry, $5.20 per cubic yard; ironwork, $0.0785 per pound; tug levers and rods, $0.11 per pound; stop-water (jam) pipes, $1.85 per linear foot; drilling holes in old ironwork, $0.25 each; white-pine timber, $80 per 1,000 feet B. M.; oak timber, $72 per 1,000 feet B. M.

Dates of approval: Original contract, November 17, 1904; supplemental contracts, July 21 and September 28, 1905, and June 28, 1907.

Date of beginning: 30 days after notification of approval of contract.

Date of expiration: 350 fair working days after date of commencement.

Name of contractor: Atlas Portland Cement Company.

Amount and character of work: Cement in canvas sacks delivered at Fernbank, Ohio (17,000 barrels minimum; 51,000 barrels maximum).

Price per unit: $1.46 per barrel.

Date of approval: April 15, 1905.

Date of beginning: 15 days after notification of approval of contract.

Date of expiration: Contingent on progress of work.

[a] Cement to be furnished by the United States.

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E E 3.

OPERATING SNAG BOATS ON THE OHIO RIVER BELOW THE PENNSYLVANIA STATE LINE.

The act of Congress of September 19, 1890, as modified by that of June 3, 1896, provided for yearly appropriations of $50,000 for this work. For phraseology of these acts and further details, see the Annual Report for 1896, Part 4, page 2093.

The work performed under this appropriation consists in the removal of snags, wrecks, rocks, and similar obstructions to navigation. During the past fiscal year the snag boat operated over the river from the Pennsylvania State line to the mouth, a distance of 927 miles.

The plant belonging to this work consists of the snag boat *E. A. Woodruff*, fitted with all necessary tools and appliances.

The snag boat was in commission at the commencement of the fiscal year, and, except some short intervals required for repairs or caused by high water, etc., was engaged in her regular work from July 1, 1907, to January 4, 1908. The necessary repairs having been made while the boat was in ordinary, she resumed her regular work on June 10, 1908, and continued until the close of the fiscal year.

The *Woodruff* traveled 6,251 miles during the fiscal year, and removed the following obstructions: 792 snags, aggregating 3,542.66 tons; 12 rocks, measuring 170 cubic feet; 364 cords of drift, and 40 wrecks, comprising 17 coal barges, 13 coal boats, 3 fuel flats, 2 gravel barges, 2 mud scows, 1 wharf boat, 1 steam boiler, and the remains of 1 steamboat.

The importance of additional plant adapted to take full advantage of such low stages of river can not be emphasized too strongly.

It is believed that with this equipment the work can be done more efficiently and more economically than at present.

List of steamboat wrecks, by name, removed from the Ohio River during the fiscal year ending June 30, 1908, by the U. S. snag boat E. A. Woodruff.

Name.	Location.	Miles below Pittsburg.
Thomas A. Nevins	Mouth Tennessee River	920

CONTRACTS IN FORCE.

Name of contractor: Littleford Brothers.
Amount and character of work: $318. Repairing deck, etc., of U. S. snag boat *E. A. Woodruff*.
Price per unit: $318 for entire work.
Emergency contract dated March 25, 1908.
Date of beginning: March 30, 1908.
Date of expiration: April 28, 1908; completed.

Name of contractor: S. F. Johns and W. H. Hildreth.
Amount and character of work: $3,490. Rebuilding wheelhouse, etc., on U. S. snag boat *E. A. Woodruff*.
Price per unit: $3,490 for entire work.
Emergency contract dated March 30, 1908.
Date of beginning: April 6, 1908.
Date of expiration: June 3, 1908; completed.

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Name of contractor: Sheridan-Kirk Contract Company.
Amount and character of work: $447.19. Removing wrecked coal barge at Rising Sun, Ind.
Price per unit: $135 per day.
Emergency contract dated June 23, 1908.
Date of beginning: June 23, 1908.
Date of expiration: Plant discharged June 25, 1908; completed.

Summary of expenditures for operating snag boats on the Ohio River for the fiscal year ending June 30, 1908.

Office expenses and superintendence	$1,950.00
Service	19,217.83
Subsistence	3,651.30
Fuel	2,713.66
General supplies and expenses	1,668.50
Care and repair of plant	5,908.47
Total	35,109.66

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APPENDIX F F.

IMPROVEMENT OF RIVERS AND HARBORS IN THE PITTSBURG, PENNSYLVANIA, DISTRICT.

REPORT OF MAJ. H. C. NEWCOMER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Monongahela River, West Virginia.
2. Monongahela River, Pennsylvania.
3. Operating and care of locks and dams, Monongahela River, West Virginia and Pennsylvania.
4. Allegheny River, Pennsylvania, open-channel work.
5. Allegheny River, Pennsylvania, construction of locks and dams.
6. Operating and care of locks and dams, Allegheny River, Pennsylvania.
7. Ohio River, Pennsylvania.
8. Dredging Ohio River, Pennsylvania.
9. Operating snag boats on the Ohio River, Pennsylvania.
10. Operating and care of locks and dams, Ohio River, Pennsylvania.
11. Harbor at Pittsburg, Pennsylvania.

UNITED STATES ENGINEER OFFICE,
Pittsburg, Pa., July 18, 1908.

SIR: I have the honor to forward herewith annual reports of works under my charge for the year ending June 30, 1908.

Very respectfully, your obedient servant,

H. C. NEWCOMER,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

F F 1.

IMPROVEMENT OF MONONGAHELA RIVER, WEST VIRGINIA.

No work of improvement was conducted at Locks and Dams 10 to 15, inclusive, during the year, with the exception of a slight extension of the bank protection just below Lock 14, at a cost of $188.33, the remaining expenditures reported being on account of liabilities incurred in the preceding fiscal year. All the work covered by the projects has been completed, with the exception of the construction

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of an upper guide wall at Lock 13 and an abutment wall at Lock 12. There is no great urgency for these items of work, and they are held in abeyance until necessary plant can be spared from other localities.

Money statement.

July 1, 1907, balance unexpended	$68,804.05
June 30, 1908, amount expended during fiscal year, for works of improvement	758.93
July 1, 1908, balance unexpended	68,045.12
July 1, 1908, balance available	68,045.12

APPROPRIATIONS.

June 10, 1872, improving Monongahela River between Morgantown and New Geneva	$25,000.00
March 3, 1873, improving upper Monongahela River near Morgantown, W. Va	66,000.00
June 23, 1874, improving upper Monongahela River near Morgantown, W. Va	25,000.00
March 3, 1875, improving upper Monongahela River near Morgantown, W. Va	22,000.00
June 18, 1878, improving Monongahela River, West Virginia and Pennsylvania	25,000.00
March 3, 1879, improving Monongahela River, West Virginia and Pennsylvania	24,000.00
June 14, 1880, improving Monongahela River, West Virginia	25,000.00
March 3, 1881, improving Monongahela River, Pennsylvania and West Virginia	25,000.00
August 2, 1882, improving Monongahela River, West Virginia	25,000.00
July 5, 1884, improving Monongahela River, West Virginia	45,000.00
August 5, 1886, improving Monongahela River, Pennsylvania and West Virginia	90,900.00
August 11, 1888, improving Monongahela River, West Virginia	35,000.00
September 25, 1889 (allotment)	4,000.00
July 13, 1892, improving Monongahela River, West Virginia	25,000.00
August 18, 1894, improving Monongahela River, West Virginia and Pennsylvania	20,000.00
June 3, 1896, improving upper Monongahela River, West Virginia	30,000.00
June 4, 1897, improving upper Monongahela River, West Virginia	350,000.00
July 1, 1898, improving upper Monongahela River, West Virginia	400,000.00
June 28, 1902, improving Monongahela River, West Virginia	350,000.00
April 28, 1904, improving Monongahela River, West Virginia	100,000.00
Total	1,711,900.00
Received on bond of failing contractor	107,463.86
Receipts from sales	21.64
	1,819,385.50

COMMERCIAL STATISTICS.

Traffic through Locks 9–15, inclusive, for the calendar year 1907, as measured by the commerce through Lock 9.

Freight	tons (2,000 pounds)	58,534
Passengers	number	14,361

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F F 2.

IMPROVEMENT OF MONONGAHELA RIVER, PENNSYLVANIA.

Rebuilding Lock and Dam 3.—This work was in local charge of Capt. E. M. Adams, Corps of Engineers, from the beginning of the fiscal year to November 21, 1907, when it was practically completed.

CONDITION OF WORK AT BEGINNING OF FISCAL YEAR.

The lock, guard, and guide walls, the power house, and two lock keepers' houses had been completed; the operating machinery and air and water lines had been installed; the lock gates had been erected; the pier about midway in dam had been completed and foundation of dam about 87 per cent completed.

OPERATIONS DURING THE FISCAL YEAR.

During the year work was carried on by hired labor until the practical completion of the dam in October, 1907, the quantities of materials placed or work done being as follows: Stone placed, 12,725 cubic yards; concrete placed, 4,142 cubic yards; paving completed, 7,300 square feet; built concrete bumper block at end of power house; laid floor way on top of all lock gates; planked gates of river chamber of lock. Owing to unfavorable stage of river since completion of the dam, work on installation of the steel movable top for dam has not yet been undertaken. It is expected to complete the installation of the movable top this season.

Rebuilding Lock and Dam 5.—This work was in local charge of Capt. A. E. Waldron, Corps of Engineers, during the fiscal year.

CONDITION OF WORK AT BEGINNING OF FISCAL YEAR.

The plans for the dam and abutment had been approved and those for the masonry of lock had been prepared, but no actual work of construction had been begun.

OPERATIONS DURING THE FISCAL YEAR.

Plans for the lock, guide, and guard walls were approved by the Chief of Engineers, United States Army, under date of July 9, and under date of September 16 a contract was entered into with H. E. Talbott & Co., of Dayton, Ohio, for the construction of this part of the work.

The contractors began work of erecting plant in November, 1907, and office buildings, blacksmith shop, general repair shop, and storage bins for cement, with a capacity of 3,000 barrels, were erected. Two pile trestles the entire length of the lock and guide walls were also erected, 1,200 piles and 260,000 feet B. M. of timber being used for this purpose. These trestles support two gantry cranes, which were placed in operation on June 16. The outer trestle also serves as part

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of the cofferdam. An ice breaker was built at the head of each trestle in order to protect the cranes.

Excavation was commenced in June for the lower guide walls and 3,000 cubic yards were removed. The bank is being protected against slide by the use of steel sheeting and necessary bracing. The timber work of the cofferdam is practically completed, except two small sections at the upper and lower ends. The cofferdam is now being filled with earth.

Assembling of plant and work on the abutment was started by hired labor about June 1. Round piles were driven for a trestle to carry a traveling derrick, which will be used in building the abutment.

Harbor lines, Monongahela River, Brownsville to Rices Landing.—The computation of the cooordinates of the harbor lines was completed and the coordinates were placed on the two sets of tracings (12 sheets).

The maps showing lines as recommended for establishment from Brownsville to Lock 6, at Rices Landing, were forwarded to the Department with report dated March 19, 1908.

Estimate for fiscal year 1910.—This estimate of $846,000 includes $200,000 for completion of new Lock and Dam 5 under continuing contract as authorized by the river and harbor act of March 2, 1907: $43,000 for the extension of the upper guide wall upstream and of the middle lock wall downstream at Lock 2; $258,600 for the partial reconstruction of Lock 1 (for which total estimated cost is $502,000), and $344,400 for the partial reconstruction of Lock 4 (for which total estimated cost is $527,000).

The first item has already been authorized by Congress as stated above. The item of $43,000 for Lock 2 is in addition to what has hitherto been authorized for that work. Appropriations already made have completed this lock and dam sufficiently to place them in operation, but the upper guide wall could not be carried upstream as far as it should be built in order to give a reasonable degree of convenience and safety to passing fleets. This is particularly so at higher stages of the river when the currents are strong and boats are endangered by not having a safe place to make fast when approaching the lock. The magnitude of this danger is shown by the loss of the steamer *Stella Moren* and its tow of coal boats on March 7, 1908, (see account of accident on p. 1767) when they were swept over the dam and destroyed with a loss of 3 lives. The extension of the middle wall a short distance downstream is necessary in order to provide means for handling boats approaching from below that are to pass through the outer lock chamber.

The necessity for the reconstruction of Locks 1 and 4 was fully discussed in House Document No. 209, Fifty-eighth Congress, second session. This report also included Nos. 3 and 5 for whose reconstruction provision has since been made. The total estimate for Nos. 1 and 4 was $872,167. The present estimates, $502,000 and $527,000, respectively, for complete reconstruction aggregate $1,029,000. The increase of $156,833 for the two works is accounted for partly by the necesssity of removing more of the old masonry than was first expected, partly by increasing unit prices under the eight-hour law as now enforced, and partly by a greater allowance for contingencies, which must be made liberal in attempting to remodel such old structures. Partial repairs already made at No. 1 have disclosed a very

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serious condition of the masonry of the larger chamber in that lock, which may lead to its failure at any time and thereby block traffic at this place. Both at No. 1 and No. 4 it is proposed to first rebuild the small outer chambers, which are 50 feet by 158 feet, using the standard size for new locks which are 56 feet by 360 feet.

Money statements.

CONSOLIDATED.

July 1, 1907, balance unexpended	$368,660.10
Amount appropriated by sundry civil act approved May 27, 1908	300,000.00
Amount received from sale of condemned property	46.55
	668,706.65
June 30, 1908, amount expended during fiscal year for works of improvement	100,536.36
July 1, 1908, balance unexpended	568,170.29
July 1, 1908, outstanding liabilities	10,105.78
July 1, 1908, balance available	558,064.51
July 1, 1908, amount covered by uncompleted contracts	394,994.07
Amount (estimated) required for completion of existing project	243,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	846,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

REBUILDING LOCK NO. 2.

July 1, 1907, balance unexpended	$3,782.37
June 30, 1908, amount expended during fiscal year for works of improvement	11.95
July 1, 1908, balance unexpended	3,770.42
Amount (estimated) required for completion of existing project	43,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	43,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

REBUILDING LOCK NO. 3.

July 1, 1907, balance unexpended	$98,783.74
Amount received from sale of condemned property	46.55
	98,830.29
June 30, 1908, amount expended during fiscal year for works of improvement	79,341.26
July 1, 1908, balance unexpended	19,489.03
July 1, 1908, outstanding liabilities	563.41
July 1, 1908, balance available	18,925.62
July 1, 1908, amount covered by uncompleted contracts	1,201.58

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REBUILDING LOCK NO. 5.

July 1, 1907, balance unexpended	$254,440.06
Amount appropriated by sundry civil act approved May 27, 1908	300,000.00
	554,440.06
June 30, 1908, amount expended during fiscal year for works of improvement	17,033.15
July 1, 1908, balance unexpended	537,406.91
July 1, 1908, outstanding liabilities	9,542.37
July 1, 1908, balance available	527,864.54
July 1, 1908, amount covered by uncompleted contracts	393,702.49
Amount (estimated) required for completion of existing project	200,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	200,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

LOCKS 3, 6, ETC.

July 1, 1907, balance unexpended	$3,803.93
July 1, 1908, balance unexpended	3,803.93

LOCKS NOS. 5 AND 6.

July 1, 1907, balance unexpended	$7,850.00
June 30, 1908, amount expended during fiscal year for works of improvement	4,150.00
July 1, 1908, balance unexpended	3,700.00

APPROPRIATIONS.

August 11, 1888, costs of condemnation, Lock and Dam No. 7, Monongahela River, Pennsylvania	[a] $5,000.00
September 19, 1890, costs of condemnation, Lock and Dam No. 6, Monongahela River, Pennsylvania	[b] 5,000.00
August 11, 1888, purchase of upper Lock and Dam No. 7, Monongahela River	[c] 161,733.13
September 19, 1890, purchase of upper Lock and Dam No. 6, Monongahela River	[b] 162,000.00
June 3, 1896, costs of condemnation, property of Monongahela Navigation Company	[d] 5,000.00
June 13, 1896, award for property of Monongahela Navigation Company	3,761,615.46
March 3, 1899, improving Locks Nos. 3 and 6, and for floating plant	50,000.00
June 6, 1900, completing improvement at Locks Nos. 3 and 6, and for floating plant	135,558.00
June 13, 1902, rebuilding Lock and Dam No. 2	200,000.00
March 3, 1903, rebuilding Lock and Dam No. 2	455,961.00
March 3, 1905, certain improvements at Locks and Dams Nos. 5 and 6	7,850.00
March 3, 1905, rebuilding Lock and Dam No. 3	200,000.00
June 30, 1906, rebuilding Lock and Dam No. 3	389,196.00
March 2, 1907, rebuilding Lock and Dam No. 5	256,042.00
May 27, 1908, rebuilding Lock and Dam No. 5	300,000.00
Receipts from other sources	303.87
Total	6,095,257.46
Amount carried to surplus fund	331,274.71
Total	5,763,982.75

[a] Partly applied; $98.64 to surplus fund.
[b] To surplus fund.
[c] Partly applied; $161,333.13 to surplus fund.
[d] Partly applied; $2,842.94 to surplus fund.

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CONTRACTS IN FORCE.

FURNISHING AND DELIVERING 23 FLATS OF SAND AND 70 FLATS OF GRAVEL AT NEW LOCK NO. 3, MONONGAHELA RIVER.

Contractor: Rodgers Sand Company, Pittsburg, Pa.
Rates: Sand, 2 cents per bushel; gravel, 1½ cents per bushel.
Date of approval: [a]
Date of beginning work: } As required by due notice.
Date of expiration: }

FURNISHING AND DELIVERING 500 PIECES OF OAK AT ROUNDHOUSE SIDING, MONONGAHELA DIVISION, PENNSYLVANIA RAILROAD, WEST ELIZABETH, PA. (NEW LOCK NO. 3, MONONGAHELA RIVER).

Contractor: The McClure Timber Company, Pittsburg, Pa.
Rate: $30 per M feet B. M.
Date of approval: [a]
Date of beginning work: } On or before June 30, 1906 (extended for a reason-
Date of expiration: } able period).

FURNISHING AND DELIVERING 3,000 BARRELS OF CEMENT (4 SACKS TO CONSTITUTE A BARREL) ON ROUNDHOUSE SIDING, MONONGAHELA DIVISION, PENNSYLVANIA RAILROAD, WEST ELIZABETH, PA. (NEW LOCK NO. 3, MONONGAHELA RIVER).

Contractor: D. J. Kennedy Company, Pittsburg, Pa.
Rate: 47½ cents per sack of 95 pounds, less 7½ cents each for return of empty sacks.
Date of approval: [a]
Date of beginning of work: July 1, 1906.
Date of expiration: December 1, 1906 (extended for a reasonable period).

BUILDING AND DELIVERING A STEEL MOVABLE TOP FOR NEW DAM NO. 3, MONONGAHELA RIVER.

Contractor: Penn Bridge Company, Beaver Falls, Pa.
Rates: Structural steel, including all bolts and washers, 5.35 cents per pound; bronze springs and bolts, 80 cents per pound; rubber packing, 65 cents per pound; malleable iron hinges, 13.5 cents per pound.
Date of approval: May 14, 1907.
Date of beginning work: June 1, 1907.
Date of expiration: September 28, 1907.

BUILDING A LOCK WITH TWO CHAMBERS, TWO GUIDE WALLS, AND TWO GUARD WALLS, AT BROWNSVILLE, PA., MONONGAHELA RIVER (NEW LOCK 5).

Contractors: H. E. Talbott & Co., Dayton, Ohio.
Rates: Earth excavation, 50 cents per cubic yard; rock excavation, $2 per cubic yard; rock fill, 30 cents per cubic yard; concrete, $6.50 per cubic yard; piles, 50 cents per linear foot; sheet piles and wales, $60 per M feet B. M.; pile shoes, 5 cents per pound; stone ballast, $2 per ton of 2,000 pounds; shoring to prevent slides, cost plus 15 per cent.
Date of approval: September 28, 1907.
Date of beginning work: October 20, 1907.
Date of expiration: September 30, 1909.

F F 3.

OPERATING AND CARE OF LOCKS AND DAMS, MONONGAHELA RIVER, WEST VIRGINIA AND PENNSYLVANIA.

Aside from routine operations and minor repairs the principal items of work at the various locks and dams were as follows:

Lock and Dam 1, Pittsburg, Pa.—Work on the rebuilding of 139 linear feet of the middle wall (built in 1848) which, for want of

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[a] Emergency.

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headers in the masonry with which to tie the face stones to the backing, was threatening to fall down, was commenced in September. After removing the concrete top of the old wall it was found that the mortar joints and many of the backing stones were greatly decayed, necessitating the removal of about 12 to 14 feet depth of the backing and about 18 feet depth of the face work before coming to durable material. All of the clay and mud filling between the walls of the inner and outer lock chambers had to be removed owing to the discovery that the damaged wall had a base width of only 4½ feet, while at middle height it was 9 feet thick. Hundreds of leaks from the outer lock, which was kept in use throughout the progress of the work, developed as the removal of the mud proceeded, greatly increasing the difficulty. Finally, the solid rock foundation was reached and four forms for concrete were built in place and filled, the concrete being wheeled in barrows from above the lock several hundred feet. The necessity for this long wheeling of concrete, etc., arose from the constant traffic through the outer lock which interfered with the use of derrick boats.

During October 968 steamers and 3,314 boats and barges passed through the outer lock, averaging one locking every seventeen minutes night and day. The work was done with two shifts working eight hours each. The work involved the building of a cofferdam in order to pump out the large lock, requiring one 12-inch, one 10-inch, and one 4-inch pump; actual pumping commenced September 25. The lock was opened for use November 17. The opportunity was taken advantage of to thoroughly repair the lower miter sills of the large lock, placing new angle irons on same, and cutting out the rock bottom in the lower gate recess, and repairing the lock gates and valves extensively.

The principal items of work done were as follows:

	Cubic yards.
Clay and mud removed from between walls	560
Removal of old masonry	500
New concrete in four monoliths (leaving 123.7 cubic yards old masonry in wall)	768

The cost of the work, as shown on itemized statements from the superintendent of repairs, was:

Materials purchased	$1,601.35
Materials furnished from boat yard	2,796.35
Labor of boat crews and hired laborers	7,765.99
Total cost	12,163.69

The statement includes salaries of employees of repair steamers *Slackwater*, *Swan*, and *Craneboat;* towing, fuel, and pumping expenses; cement, sand, gravel, material for forms, and some material used for repairs of upper and lower guide cribs. Also cost of removing and replacing machinery on lock walls and replacing 117 square yards of concrete pavement in space between lock walls.

The gates of the outer or small lock were thrown for repairs to valves and overhauled in July, and 3,640 feet B. M. new facing plank placed on the upper guard crib. In February 4,300 feet B. M. new facing plank was placed on the lower guide crib. During the fiscal year the costly vertical concrete wall, 1,900 feet long, erected by the National Tube Company along the harbor line, was completed, leav-

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ing about 230 feet only to be built by the Government to connect with the upper guide crib. A large amount of material outside the tube company's wall was removed by dredging, greatly improving the approach to the lock for fleets.

The cost of building a crib between the long wall referred to and the Government's present guide crib has been included in the estimate for new locks at this dam.

Lock and Dam 2, Braddock, Pa., 11.2 miles above mouth of river.—The most important repairs were those to the filling valves of the outer lock and the discharge valves of the inner lock. These are all vertical butterfly valves, and their stems proved to be too light, breaking from jarring effects probably. Repairs required bulkheading the conduits leading to and away from the valves, and closing of the respective locks, in turn, for a number of days. During the year all of the remaining portions of old Dam 2 and the old lock walls were removed, this work having been finally completed early in June. A safe depth of 12 feet now exists between the land wall of the old lock, which still remains in place, to near the timber abutment of the old dam, a distance of about 1,000 feet. Throughout the season the river remained too high to commence work on constructing a head wall at the upper end of the large lock, and placing of the steel lock gates, which are on hand ready for that place. So, also, river conditions made it inadvisable to put the drums, or adjustable tops, on the dam in working order. Throughout the year there was no occasion to place flashboards on any of the dams; the first year of the kind since 1893, when the use of flashboards during the summer and fall was inaugurated on the Monongahela River.

A distressing accident occurred at the lock on March 7, at 7.30 p. m., when the steamer *Stella Moren* and three loaded coal boats were swept over the dam, resulting in the loss of the lives of three of the steamer's crew. The accident was in no way due to negligence of the lock employees. At the time the river was very high and a strong current was setting out past the upper end of the guard wall which extends 150 feet above the lock. The *Stella Moren* did not approach by flanking, as is usual under such circumstances, but endeavored to steer her fleet direct into the inner lock, which was open and in readiness. Her tow threatened to strike the middle wall and in backing up she was caught in the cross current and began to swing around downstream across the upper end of the guard wall. Lines were passed from the steamer to the guard wall and one of the lockmen jumped on the boat and offered to cut the tow loose so as to save the steamer, but the pilot would not permit him to do so. The fleet continued to swing around, breaking the lines made fast on the wall, and drifting out into the stream, until finally it was swept nearly broadside over the middle of the dam. The fall at the dam at the time was about 4 feet, with a depth on the crest of about 9 feet. The steamer sank 200 feet below the dam in 30 feet of water; the three 1,000-ton coal boats were broken up.

Since the removal of the remaining portion of old Dam 2, one-half mile above, the cross currents at head of the lock are not so strong, but it is proposed to lengthen the upper guide wall, which is now quite short, and also to extend the guard wall, in order to provide a greater degree of safety. Funds for doing this work, however, are not yet available.

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Lock and Dam 3, Elizabeth, Pa., 23.8 miles above mouth of river.—During September the new dam was practically completed, except the placing of the drums forming the adjustable top. The work of removing old Dam 3 and the old lock walls was commenced in November. Up to June 30 more than half of the old dam had been removed, also the outer and middle walls of the old locks. About 4,000 cubic yards of stone from the dam and lock walls was deposited below the new dam where extensive scour had developed. About 200 cubic yards dimension stone was used in protecting the river bank about the abutment of the new dam. A small electric-light plant was installed in the power house and four masts for arc lights erected on the lock walls. Repairs to machinery, lock gates, etc., were of only minor importance.

Lock and Dam 4, North Charleroi, 41.2 miles above mouth of river.—The lower guide crib was raised about 4 feet for a length of about 300 feet, so that it would not be so frequently submerged. About 21,000 feet B. M. of timber were used. During May 15,000 feet B. M. timber, chiefly oak, were used in repairs to upper guide crib above the water line. About 350 cubic yards large stone were deposited below the abutment of the dam. Dredging to the amount of 2,900 cubic yards in the lower approach was done in January. The undershot water wheel operating the machinery on the river wall was repaired.

Lock and Dam 5, 58.9 miles above mouth of river.—Besides minor repairs to lock gates, no work was needed excepting in grading the grounds with material furnished gratuitously by the railroad company, which is extending a new branch line up the valley above Brownsville and passing close to the United States property line.

Lock and Dam 6, Rices Landing, 68.7 miles above mouth of river.—In making repairs to the filling valves, which lie horizontally on the breast wall floor above the upper gates, it was necessary to bulkhead the lock and shut off the water and close the lock for part of two days. No other important repair work was needed.

Lock and Dam 7, 82.73 miles above mouth of river.—Both dwellings were piped and equipped for heating and lighting with natural gas. A new platform on which to walk when operating right leaf of lower lock gate was built. Conductors on both dwellings were repaired. Exposed wood and iron of lock gates and operating machinery were given a coat of paint.

Lock and Dam 8, 87.54 miles above mouth of river.—Both dwellings and office building were piped and equipped for heating and lighting with natural gas. Minor repairs were made to lock gates and new chains were placed for operating them. Minor repairs were made to the buildings. Exposed wood and iron of the lock gates and operating machinery were given a coat of paint.

Lock and Dam 9, 93.24 miles above mouth of river.—Stone paving and riprapping below the lock were repaired and minor repairs were made to lock gates and other parts of the structure. The Stoney valve was equipped with a set of new rollers and a new chain. Exposed wood and iron of lock gates and operating machinery were given a coat of paint.

Lock and Dam 10, 102.63 miles above mouth of river.—The exteriors of both dwellings and office building were given a coat of paint. Slight repairs were made to face of dam by lock force. Three

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new grates were furnished for each of the dwellings. Four new capstan levers were furnished. Exposed wood and iron of lock gates and operating machinery were given a coat of paint.

Lock and Dam 11, 104.96 miles above mouth of river.—Riprap protection to right bank of river below dam and damage done to crest of dam by flood were repaired. Four new capstan levers were furnished. Exposed wood and iron of lock gates and operating machinery were given a coat of paint.

Lock and Dam 12, 109.84 miles above mouth of river.—A number of large stones which had been placed as protection to the river bank below the lower guide wall and which had slipped into the river were replaced upon the bank. Four new capstan levers were furnished. Exposed wood and iron of lock gates and operating machinery were given a coat of paint.

Lock and Dam 13, 111.83 miles above mouth of river.—A few minor repairs were made. Four new capstan levers were furnished. Exposed wood and iron of lock gates and operating machinery were given a coat of paint.

Lock and Dam 14, 115.48 miles above mouth of river.—Riprap protection to left bank of river below lock was repaired and the protection was extended to the downstream boundary of the United States reservation. Four new capstan levers were furnished. Exposed wood and iron of lock gates and operating machinery were given a coat of paint.

Lock and Dam 15, 124.06 miles above mouth of river.—A few minor repairs were made. Four new capstan levers were furnished. Exposed wood and iron of lock gates and operating machinery were given a coat of paint.

Boat yard and shops, near Lock 4.—Two new 100-cubic-yard capacity dredge scows were built in the yard, the irons for the same being forged and worked in the Government shop on the ground.

The sawmill building was extended in length 15 feet at each end and a new Knight Manufacturing Company's log carriage installed. A number of wickets were made complete for the Ohio River dams. A concrete mixer boat and several flats were extensively overhauled and repaired. A new lock-service flat and three needle flats for movable dams were also built. A new dipper handle was built for one of the dredge boats. Quarter boat No. 2 was repaired. The snag boat *Swan* was docked elsewhere for repairs to hull and the repair steamer *Slackwater* was hauled out on ways at Elizabeth, Pa., and very extensively repaired, including new hog chains, new bow, double chimneys for old single one, new canvas deck, painting, etc. The naphtha launch *Albatross* was overhauled at the yard. This launch has been idle for several years, but will now be of service for light towing in connection with the construction of new Dam 5.

Snagging.—During the year the snag boat *Swan* removed 19 snags from pool 1, 13 from pool 2, 19 from pool 3, and 17 from pool 4.

ALLOTMENTS FROM ACT OF JULY 5, 1884.

August 15, 1884	$1,000.00	July 10, 1886	$1,200.00
September 1, 1884	4,000.00	March 1, 1887	1,100.00
November 3, 1884	4,500.00	July 1, 1887	11,000.00
December 20, 1884	500.00	July 11, 1888	6,270.00
June 1, 1885	100.00	October 27, 1888	3,000.00
July 22, 1885	1,000.00	July 17, 1889	1,480.00

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ALLOTMENTS FROM ACT OF JULY 5, 1884—continued.

October 7, 1889	$1,500.00	July 26, 1902	$237,963.86
November 6, 1889	1,200.00	August 4, 1903	200,949.31
July 24, 1890	12,300.00	August 10, 1903	21,050.00
July 8, 1891	24,250.00	November 18, 1903	[d] 21,500.00
July 21, 1892	34,017.86	July 22, 1904	[e] 255,381.10
July 21, 1893	23,574.72	July 20, 1905	[e] 205,881.69
July 23, 1894	25,664.00	January 13, 1906	[f] 10,000.00
July 12, 1895	20,372.40	July 19, 1906	[e] 234,787.44
July 28, 1896	19,232.84	August 8, 1907	[e] 241,158.34
July 15, 1897	[a] 13,070.87	November 7, 1907	[g] 10,000.00
August 2, 1897	[b] $119,734.49	May 2, 1908	[e] 4,950.00
October 8, 1897	125.00	Receipts from other sources	8,797.21
September 1, 1898	[c] 197,627.93		
August 14, 1899	169,838.00	Total	2,479,818.48
September 7, 1900	175,474.96		
August 5, 1901	159,266.46		

Statement of expenditures for operating and care of locks and dams, Monongahela River, West Virginia, and Pennsylvania, during the fiscal year 1908.

Item.	Amount.
Salaries and wages for regular hired labor force	$174,358.57
Dam, lock, boat, and boat-yard supplies, and repair material not otherwise provided for	39,437.68
Repairs to repair plant and additional pieces of same	8,957.31
Rebuilding, repairs not otherwise provided for, dredging, and removing obstructions	28,124.22
Miscellaneous supplies and services	2,829.18
Total	[a] 253,701.96

[a] Includes expenditure on account of Isthmian Canal Commission amounting to $182.43.

COMMERCIAL STATISTICS.

Lockages made and traffic passed at Monongahela River locks during the calendar year ending December 31, 1907.

At dam—	Lockages.		Steamboats.		Coal boats, barges, flats, and boat bottoms.		Rafts.	
	Up.	Down.	Up.	Down.	Up.	Down.	Up.	Down.
	Number.	*Number.*	*Number.*	*Number.*	*Number.*	*Number.*	*Number.*	*Number.*
1	11,073	10,876	6,899	6,893	18,872	19,040	82	14
2	6,329	6,375	6,506	6,525	23,241	23,607	52	10
3	8,513	8,448	6,333	6,291	24,838	24,899	9	23
4	9,711	9,592	5,383	5,441	21,016	21,164	3	34
5	8,011	8,068	2,110	2,103	2,944	2,896	2	44
6	939	985	481	482	685	659	6	43
7	637	675	416	410	278	271	4	30
8	932	983	699	699	298	289	10	46
9	797	824	674	668	300	270	2	9
10	422	436	284	281	231	211	.....	18
11	391	412	278	278	235	220	1	21
12	372	386	275	271	200	189	1	14
13	305	315	232	234	148	144	.....	7
14	317	321	226	226	148	142	3	6
15	332	338	177	176	14	11	1	15
Aggregate	44,081	44,084	30,968	30,972	98,443	94,014	176	394

[a] Locks 8 and 9.
[b] Locks 1 to 7, inclusive.
[c] Locks 1 to 9, inclusive.
[d] Locks 10 to 15.
[e] Locks 1 to 15.
[f] For removing old Lock and Dam 2.
[g] For removing old Lock and Dam 3.

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Lockages made and traffic passed at Monongahela River locks during the calendar year ending December 31, 1907—Continued.

At dam—	Other craft.		Coal.		Coke.		Rails, steel.	
	Up.	Down.	Up.	Down.	Up.	Down.	Up.	Down.
	Number.	*Number.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1	564	590	6,360	4,978,600	.....	1,875	3	1
2	365	395	8,720	8,561,960	.....	.....	.....	.....
3	341	289	4,680	10,057,100	.....	.....	.....	.....
4	229	194	1,338	8,336,620	.....	.....	65	.....
5	80	68	260	865,720	.....	.....	.....	.....
6	268	271	572	182,760	.....	.....	14	.....
7	157	161	348	38,900	.....	.....	.....	.....
8	220	236	300	39,140	.....	.....	9	.....
9	119	119	60	38,843	.....	.....	5	.....
10	139	135	106	32,908	.....	.....	1	8
11	92	91	60	32,868	.....	.....	.....	.....
12	88	88	41	31,320	.....	.....	.....	3
13	67	64	.....	31,320	.....	.....	.....	3
14	88	70	.....	31,320	.....	.....	.....	3
15	178	181	.....	.....	.....	.....	.....	5
Aggregate	2,995	2,947	22,847	33,259,379	.....	1,875	97	18

At dam—	Other iron or steel products.		Sand.		Gravel.	
	Up.	Down.	Up.	Down.	Up.	Down.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1	47,254	22,601	506,898	48,517	1,036,863	9,276
2	6,052	9,359	152,620	92,208	682,551	2,522
3	4,118	3,023	12,084	217,317	75,587	2,552
4	2,366	1,390	76,552	552	66,187	1,297
5	2,025	219	1,331	743	1,242	.....
6	1,825	269	207	654	207	.....
7	1,541	151	207	751	207	.....
8	1,265	85	207	807	207	.....
9	1,071	82	1,220	110	207	.....
10	202	26	207	.....	207	.....
11	199	34	207	.....	207	.....
12	198	31	207	138	207	69
13	190	35	207	138	207	69
14	167	30	207	138	207	69
15	76	34	.....	.....	.....	.....
Aggregate	68,564	37,869	752,841	357,073	1,864,298	15,854

At dam—	Stone.		Brick.		Timber.	
	Up.	Down.	Up.	Down.	Up.	Down.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1	5,038	4,929	14	.....	14,368	1,102
2	618	7,440	.....	.....	10,868	2,546
3	929	11,700	.....	.....	1,792	4,718
4	1,177	4,136	6	4	2,379	7,805
5	758	4,764	80	.....	82	4,137
6	706	758	9	.....	655	5,116
7	706	753	9	6	188	3,239
8	2,724	888	9	167	355	3,281
9	177	.....	9	162	100	2,295
10	177	308	18	.....	.....	1,640
11	294	308	18	.....	14	1,787
12	441	383	18	.....	17	1,460
13	.....	489	18	.....	6	895
14	.....	.....	18	.....	14	862
15	.....	.....	.....	8	.....	848
Aggregate	13,795	36,851	151	342	30,788	40,781

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Lockages made and traffic passed at Monongahela River locks during the calendar year ending December 31, 1907—Continued.

At dam—	Lumber.		Lath and shingles.		Pit posts.	
	Up.	Down.	Up.	Down.	Up.	Down.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1	7,211	679	26	.....	10,858	.....
2	7,072	1,819	19	.....	13,925	.....
3	1,180	478	52	.....	8,150	.....
4	2,027	807	1	.....	5,000	100
5	217	1,858	17	.....	.....	5,327
6	176	1,537	17	.....	.....	5,715
7	185	1,620	.....	.....	.....	5,000
8	149	1,573	.....	1	.....	5,194
9	172	1,286	.....	1	.....	5,355
10	18	1,194	.....	.....	125	5,355
11	28	1,054	.....	.....	125	4,130
12	6	1,038	.....	.....	125	2,700
13	1	188	.....	.....	125	1,275
14	2	112	.....	.....	125	275
15	22	112	.....	.....	.....	.....
Aggregate	18,461	14,850	132	2	38,573	41,497

At dam—	Mine braces.		Ties, railroad.		General merchandise.	
	Up.	Down.	Up.	Down.	Up.	Down.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1	668	.....	5,080	.....	7,488	17,724
2	880	.....	3,800	.....	7,298	5,332
3	560	.....	2,540	400	7,822	2,203
4	260	.....	1,000	.....	7,142	2,205
5	.....	.....	160	3,830	6,587	2,104
6	.....	.....	.....	3,700	5,142	1,654
7	.....	.....	.....	3,741	3,405	1,224
8	.....	.....	.....	4,225	2,563	1,035
9	.....	.....	.....	3,500	2,184	1,035
10	.....	.....	.....	3,550	992	353
11	.....	.....	220	2,002	934	403
12	.....	.....	327	2,010	898	335
13	.....	.....	.....	25	868	307
14	.....	.....	.....	.....	857	451
15	.....	.....	.....	.....	834	426
Aggregate	2,368	.....	13,127	26,963	54,984	40,134

At Dam—	Farm, dairy, and orchard products.		Live stock, large.		Live stock, small.	
	Up.	Down.	Up.	Down.	Up.	Down.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1	1,329	122	543	381	.....	25
2	1,332	149	581	404	.....	21
3	1,264	157	604	529	.....	14
4	1,237	107	551	350	.....	21
5	966	133	274	186	1	11
6	746	144	208	157	.....	21
7	392	44	99	79	1	.....
8	275	44	95	63	3	.....
9	222	43	84	70	3	.....
10	44	21	33	23	3	.....
11	50	27	36	24	3	.....
12	51	24	34	21	3	.....
13	52	26	34	23	3	.....
14	47	27	33	27	3	.....
15	53	27	35	19	3	.....
Aggregate	8,060	1,145	3,239	2,356	26	13

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Lockages made and traffic passed at Monongahela River locks during the calendar year ending December 31, 1907—Continued.

At Dam—	Total tonnage.		Passengers.	
	Up.	Down.	Up.	Down.
	Tons.	*Tons.*	*Number.*	*Number.*
1	1,650,051	5,080,813	14,175	13,370
2	896,331	8,706,785	12,995	11,159
3	121,362	10,280,265	10,428	7,981
4	167,268	8,355,026	8,428	6,563
5	13,895	888,717	23,999	18,374
6	10,479	202,282	7,525	6,162
7	7,238	56,688	6,674	5,768
8	8,181	57,261	8,255	8,071
9	5,514	53,020	7,279	7,082
10	2,130	45,136	3,252	3,350
11	2,385	42,637	3,274	3,436
12	2,573	39,666	3,060	3,245
13	1,736	34,883	3,048	3,317
14	1,675	33,887	3,153	3,259
15	1,023	974	3,432	3,494
Aggregate	2,891,841	33,876,540	118,777	104,631

Total commerce of the river.

	Products.	Passengers.
Fiscal year:	*Tons.*[a]	*Number.*
1902	9,100,887	181,527
1903	11,369,814	101,457
1904	9,268,736	116,174
1905	9,211,752	78,458
1906	11,447,444	77,134
1907	11,817,128	47,216
Calendar year 1907	12,772,508	42,878

[a] 2,000 pounds.

The total commerce of the Monongahela River is estimated by taking the aggregate of the greatest items of the different kinds of freight passing up and down at any single lock plus the coal mined and shipped in pools 1 and 2, which amount is manifestly less than the real movement of commerce.

Monthly lockages of vessels at different dams for the calendar year 1907.

Lock No.—	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1	1,054	1,452	1,797	2,014	2,088	1,726	1,954	1,788	2,026	2,192	2,157	1,751	21,949
2	756	940	980	1,201	1,200	1,096	1,181	1,161	1,100	1,033	1,068	1,048	12,704
3	1,246	1,677	1,515	1,872	1,998	1,763	1,149	1,237	1,151	1,160	1,109	1,089	16,961
4	1,139	1,500	1,449	1,769	1,808	1,705	1,689	1,789	1,600	1,753	1,659	1,498	19,308
5	288	401	397	519	555	563	612	655	545	538	524	482	6,079
6	92	122	139	138	151	147	220	242	176	166	161	175	1,924
7	50	61	62	100	127	126	143	193	146	125	96	83	1,312
8	79	130	96	166	197	168	213	234	205	156	140	131	1,915
9	55	69	65	142	177	163	168	202	180	182	140	128	1,621
10	9	28	17	38	99	96	105	119	110	92	82	63	858
11	5	31	16	30	95	82	80	114	99	94	88	69	803
12	5	35	16	48	92	77	84	96	89	78	81	62	758
13	5	14	16	25	76	70	78	88	77	65	71	45	620
14	3	8	17	27	85	78	73	86	86	62	67	46	638
15	1	1	7	28	66	83	107	126	100	74	51	26	670
Total	4,787	6,469	6,589	8,112	8,754	7,943	7,751	8,125	7,690	7,715	7,489	6,691	88,115

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The locks were temporarily closed to navigation during the calendar year 1907 for times and reasons as follows:

Locks.	Repairs.	Floods.	Ice.	Total time.	Number of times.
No. 1:	d. h. m.	d. h. m.	d. h. m.	d. h. m.	
Large	64 14 45	12 5 15		76 20 0	27
Small	5 7 15			5 7 15	15
No. 2:					
Inside		8 2 0		8 2 0	4
Outside	24 23 30			24 23 30	8
No. 3:					
Inside		21 3 30		21 3 30	29
Outside	2 11 0			2 11 0	2
No. 4:					
Large		15 20 50		15 20 50	6
Small		5 5 0		5 5 0	4
No. 5		11 19 40		11 19 40	6
No. 6		7 20 30		7 20 30	6
No. 7		12 23 0		12 23 0	6
No. 8		7 21 0		7 21 0	4
No. 9		14 6 45		14 6 45	6
No. 10	1 0 0	5 4 0		6 4 0	5
No. 11	0 11 0	16 14 0	6 0 0	22 25 0	8
No. 12		6 0 20		6 0 20	5
No. 13		8 18 45	5 12 0	14 6 45	9
No. 14		7 21 0	5 0 0	12 21 0	6
No. 15		7 18 0		7 18 0	5

F F 4.

IMPROVEMENT OF ALLEGHENY RIVER, PENNSYLVANIA, OPEN-CHANNEL WORK.

Minor repairs were made to the following dams and dikes during September and October of 1907: At Hickory Ripple dam (159.3 miles from the mouth), about 5 cubic yards of dislodged paving were replaced; at Pithole Ripple dam (142.4 miles from the mouth), about 45 cubic yards of riprap and paving were replaced; at Red Bank dike, about 8 cubic yards of riprap and paving were replaced; at Nicholson Island dam, about 200 large bowlders, approximating 100 cubic yards, were placed immediately below the dam to prevent undermining scour, and about 12 cubic yards of riprap were replaced in the dam.

The river conditions have been such that no attempt has been made to determine what damage the dams and dikes have sustained from ice and floods during the past winter season.

Money statement.

July 1, 1907, balance unexpended	$2,891.08
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	600.28
July 1, 1908, balance unexpended	2,290.80
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

March 3, 1879	$10,000	June 3, 1896	$12,500
June 14, 1880	20,000	March 3, 1899	15,000
March 3, 1881	25,000	August 17, 1900 (allotment, June 6, 1900)	5,000
August 2, 1882	15,000	June 13, 1902	10,000
July 5, 1884	35,000	June 13, 1902 (allotment, June 24, 1904)	5,000
August 5, 1886	30,000		
August 11, 1888	25,000	Total	265,000
September 19, 1890	20,000		
July 13, 1892	25,000		
August 18, 1894	12,500		

COMMERCIAL STATISTICS, CALENDAR YEAR 1907.

Again the usual custom of gathering commercial statistics of the Allegheny River by communication with the individual shippers and receivers of freight by water has been followed, that being the only means available for securing even an approximate estimate of the water transportation of the valley. Generally reports of river trade are solicited only from those who conduct a regular navigation business, and little is known about the commerce of the much larger number of small, intermittent shippers. In view of these conditions it is probable that the commerce of the entire river as reported is less than the actual amount.

Commodity.	Tons.[a]	Commodity.	Tons.[a]
Bottoms, coal boat (new)	2,540	Posts	6,114
Braces	198	Sand	397,673
Coal	496,706	Ties, railroad	7,695
Gravel	419,454	Timber	12,556
Lath	33		
Lumber	3,873	Total	1,346,841

[a] 2,000 pounds.

F F 5.

IMPROVEMENT OF ALLEGHENY RIVER, PENNSYLVANIA, CONSTRUCTION OF LOCKS AND DAMS.

This work was in local charge of Mr. J. B. Dimmick, assistant engineer, during the fiscal year.

Lock and Dam 2.—Operations in connection with the building of the dam were continued by the James H. McQuade Company. The quantities of materials furnished and placed, or work done, and price paid therefor per unit were as follows:

Under contract of May 2, 1905:

Item.	Designation.	Quantities.	Price per unit.
Round piles	Linear feet	4,623	$0.45
Sheet piles	Feet B. M.	68,016	[a] 70.00
Oak timber	....do	50,669	[a] 70.00
Large stone	Cubic yards	2,163	2.50
Concrete	....do	1,204	7.00
Drift bolts	Pounds	9,760	.05

[a] Per thousand.

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Under supplemental contract of April 24, 1907:

Item.	Designation.	Quantities.	Price per unit.
Hemlock timber:			
20 feet or less	Feet B. M.	25,110	a $24.00
22 and 24 feet	do	12,660	a 25.00
26 and 27 feet	do	5,980	a 27.00
28 and 29 feet	do	3,360	a 28.00
30 feet	do	1,500	a 28.00
30 feet, squared	do	4,800	a 31.50
20 feet or less, squared	do	150	a 25.00
22 or 24 feet, squared	do	12,560	a 27.00
Oak timber:			
20 feet or less	do	1,080	a 34.00
30 feet	do	1,200	a 33.00
28 and 29 feet	do	570	a 30.00
20 feet or less, squared	do	1,492	a 35.00
Drift bolts	Pounds	5,331.6	.025
Crib stone	Tons	358.04	1.15

a Per thousand.

Generally speaking, the above work was hampered by an unfavorable river condition during the working season. The water did not get below a 4-foot stage at Freeport (the stage at which work is considered practicable) until July 7. The stage from this date until October 4 was favorable, but extensive cofferdam work and the unexpected difficulties of unwatering the cofferdam consumed most of this favorable time, so that the actual work accomplished fell far below that expected at the beginning of the season. It required one 10-inch, two 12-inch, and two 15-inch centrifugal pumps to unwater the cofferdam, with no large leaks showing. A general seepage through the gravel filling and through the river bed underneath the coffer seemed to be the cause of the trouble.

On October 4 the work was flooded, and was again flooded on October 28. The river stage, after the latter date, was so unfavorable that no more actual work was accomplished.

The construction of a reenforced concrete power conduit, proposed to be used at some future time in connection with the operation of this lock by water power, was completed. The contractors on this work were Pihl & Miller, of Pittsburg, Pa. The amount of concrete placed under this contract during the year was 4.4 cubic yards at a rate of $7.85 per yard.

The filling of lock grounds arranged for with the Pennsylvania Railroad Company, which material is furnished and unloaded practically in place free of charge, was continued and completed, except the furnishing of a comparatively small amount as top soil. The number of cubic yards placed was 20,749.

The work of strengthening the abutment in accordance with the plans approved by the Chief of Engineers, United States Army, on March 26, 1907, was carried on by hired labor forces, and completed with the exception of filling behind the new abutment and decking the submerged protection crib.

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The quantities of material furnished and placed or the work done and the cost thereof per unit are as follows:

Item.	Designation.	Quantities.	Price per unit.
Gravel excavation by dredge	Cubic yards	14,811	$0.239
Earth excavation by hand	do	818	.920
Back fill by hand	do	180	.777
Round piles	Linear feet	700	1.058
Wakefield sheet piling	Feet B. M	16,400	a 89.22
Steel sheet piles	Linear feet	10,654	1.36
Concrete	Cubic yards	1,029.8	8.52
Crib timber	Feet B. M	76,660	a 61.38
Crib stone	Cubic yards	1,850	2.31
Large stone	do	650	2.85
Revetment large stone	do	250	4.68
Revetment small stone	do	150	4.51

a Per thousand.

Lock and Dam 3.—The building of the dam had been under contract with Sloan, McIlvain & Ott Brothers, of Allegheny, Pa., and had been completed except the placing of some back fill along the upstream face of it. The blasting out of a portion of this dam in January, 1907, prevented the completion of this work last season, and it was considered advisable and fair to release the contractors, and final payment was therefore made to them.

The work in connection with the reconstruction of the abutment, lengthening of the dam, restoring land washed away, replacing the portion of the dam destroyed by blasting, and the returning and confining of the river to its natural channel according to the approved plans, was carried on with a hired labor force during the entire working season.

The lowering of the unimpaired portion of the dam from elevation 733 to 731.5 was completed, and that portion damaged by the flood of March, 1907, was repaired. The abutment with its submerged protection crib and the additional 95-foot section of the dam were completed, with the exception of some of the decking on the submerged crib and on the apron of this section of the dam.

The completion of this work closed the channel which the river made for itself around the abutment end of the old dam at the time of the failure of the abutment and forced the river back to its old channel and over the disrupted portion of the dam. The work of restoring the land was carried on at such times as the dredge could be spared. Nearly all material placed was dredged and dumped where desired, principally behind the abutment cribs. Some material was received from the railroad company, free of charge, and was unloaded at the concrete return wall of the new abutment by the United States. This material served the double purpose of restoring land and making the abutment secure against winter and spring floods.

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The quantities of materials furnished and placed or work done and the cost thereof per unit are as follows:

Item.	Designation.	Quantities.	Price per unit.
Building and sinking crib	Feet B. M	644,892	[a] $56.[illegible]
Back fill by railroad	Cubic yards	1,740	.[illegible]
Round piles driven	Linear feet	2,452	.[illegible]
Small stone placed	Cubic yards	12,049	[illegible]
Large stone placed	do	990	1.[illegible]
Excavation by hand	do	1,226	.[illegible]
Concrete placed	do	831	[illegible]
Wakefield piling built	Feet B. M	5,184	[a] 48.[illegible]
Steel sheet piling driven	Linear feet	20,629	1.[illegible]
Excavation by dredge	Cubic yards	42,520	.[illegible]
Back fill by dredge	do	24,175	.[illegible]

[a] Per thousand.

The unit prices submitted for work done by hired labor are not arrived at by considering only the expense connected with each item during the fiscal year, but include all expenses for preparatory work done previous to July 1, 1907.

During the month of June, 1908, work was resumed on the dam, and about 20,850 feet B. M. crib timber, 946 pounds iron, and 22[illegible] cubic yards stone were placed in the work. Owing to the fact that the materials placed constitute only a very small percentage of the work to be done in this connection, and that practically all the preparatory work necessary for the completion of the project has been done, the unit costs for this work will be included in the next annual report.

Harbor lines, Allegheny River, from Pittsburg to Natrona.—This work was in local charge of Mr. H. C. Gould, assistant engineer, during the fiscal year.

On account of other and more urgent work, the laying out of these lines was suspended for a time. A duplicate set of the tracings (15 sheets) was made.

Estimate for fiscal year 1910.—The estimate of $110,300 as the amount that can be profitably expended in the fiscal year 1910 is in addition to appropriations heretofore made, which were expected to complete the three locks and dams that have been authorized in the Allegheny River. This additional sum is required in order to pay for damages to private property caused by the failure of the abutment of Dam 3 in January, 1907, and to complete the restoration of the land washed away at that time. The appropriation of $200,000 made to repair this dam will be practically exhausted in rebuilding the abutment and the portion of the dam that was blown out. This will place the work in operation again, but will not provide for the damages to houses and land, as mentioned above. It is important that necessary funds for this purpose should be furnished as soon as practicable, both as a matter of justice to the property owners and in order to limit the amount of damages, which depend to some extent upon the time required to restore the property.

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Money statement.

July 1, 1907, balance unexpended	$310,527.78
Amount received from sale of blueprint maps	25.85
	310,553.63
June 30, 1908, amount expended during fiscal year, for works of improvement	214,089.44
July 1, 1908, balance unexpended	96,464.19
July 1, 1908, outstanding liabilities	12,180.08
July 1, 1908, balance available	84,284.11
July 1, 1908, amount covered by uncompleted contracts	46,694.15
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908, for works of improvement	110,300.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 5, 1886	$37,500.00	June 28, 1902	$118,500.00
August 11, 1888	35,000.00	March 3, 1905 (allotment of July 12, 1905)	10,000.00
September 19, 1890	35,000.00	June 30, 1906	281,226.63
July 13, 1892	40,000.00	March 2, 1907	235,090.00
August 18, 1894	40,000.00	Received from other sources	196.55
June 3, 1896	50,000.00		
June 4, 1897	350,000.00		
July 1, 1898	300,000.00		
March 3, 1901	126,000.00	Total	1,658,423.18

CONTRACTS IN FORCE.

BUILDING DAM 2 AT SIX-MILE ISLAND, ALLEGHENY RIVER.

Contractor: James H. McQuade Company, Pittsburg, Pa.

Rates: Original contract. Gravel excavation, 60 cents per cubic yard; back fill, 60 cents per cubic yard; embankment, 60 cents per cubic yard; round piles, 45 cents per linear foot; sheet piles, $70 per thousand feet B. M.; oak timber, $70 per thousand feet B. M.; hemlock timber, $50 per thousand feet B. M.; stone crib filling, $2.50 per cubic yard; large stone, $2.50 per cubic yard; concrete, $7 per cubic yard; drift bolts, 5 cents per pound.

Rates: Supplemental contract. Hemlock timber, 10 by 12 inches, 20 feet or less, $24 per thousand feet B. M.; 10 by 12 inches, 22 and 24 feet, $26 per thousand feet B. M.; 10 by 12 inches, 26 and 27 feet, $27 per thousand feet B. M.; 10 by 12 inches, 28 and 29 feet, $28 per thousand feet B. M.; 10 by 12 inches, 30 feet, $29 per thousand feet B. M.; 10 by 12 inches, 30 feet (squared), $30.50 per thousand feet B. M.; 10 by 12 inches, 20 feet or less (squared), $25.50 per thousand feet B. M.; 10 by 12 inches, 22 or 24 feet (squared), $27.50 per thousand feet B. M. Oak timber, 10 by 12 inches, 20 feet or less, $34 per thousand feet B. M.; 10 by 12 inches, 30 feet, $39 per thousand feet B. M.; 10 by 12 inches, 28 and 29 feet, $38 per thousand feet B. M.; 10 by 12 inches, 26 and 27 feet, $37 per thousand feet B. M.; 10 by 12 inches, 20 feet or less (squared), $35.50 per thousand feet B. M. Drift bolts, 2.75 cents per pound; crib stone, $1.15 per ton.

Dates of approval: Original contract, May 13, 1905; supplemental contract, August 6, 1907.

Date of beginning work: June 14, 1905.

Date of expiration: November 30, 1906 (extended for a reasonable period).

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BUILDING A REENFORCED CONCRETE POWER CONDUIT AT LOCK 2, ALLEGHENY RIVER.

Contractor: Pihl & Miller, Pittsburg, Pa.
Rates: Excavation, 60 cents per cubic yard; concrete, $7.85 per cubic yard; steel, 4 cents per pound.
Date of approval: [a]
Date of beginning work: September 10, 1906.
Date of expiration: September 25, 1906 (extended for a reasonable period).

F F 6.

OPERATING AND CARE OF LOCKS AND DAMS, ALLEGHENY RIVER, PENNSYLVANIA.

Lock and Dam 1.—The structure continued in operation, performing its functions generally in a satisfactory manner during the entire year. No serious damage resulted to it owing to ice and freshets. Slight difficulty was experienced on the first occasion after a winter's rest to raise the smaller bear-trap gate, both in seasons of 1907 and 1908, each time requiring one or two days to overcome. The trouble is thought to be due to refuse deposits or foreign bodies getting jammed between the ends of the leaves and the adjacent masonry work.

In addition to its regular services of maneuvering and caring for the lock and dam the operating force made the following repairs, etc.: Removed old valve-operating gearing and gate-operating capstans and replaced them with new ones capable of operation by a smaller number of men; repaired wicket quoins; sheeting of upper lock gates, which had been injured by ice; running boards and hand rails on gates and snubbing posts on guide cribs; rebuilt shed over compressed-air plant at abutment, destroyed by ice during the February freshet; grouted stone paving of both guide cribs; put new roof on blacksmith shop and patternhouse and repaired and painted those buildings; placed wooden covers over new valve-operating gearing and boxed lock-gate hinges; set one new snubbing post on upper guide crib and three on river wall of lock; repaired and replaced three wickets, horses, and props on Chanoine dam; and twice removed sedimentary deposits from above upper and below lower gates.

An investigation disclosed that considerable scour had taken place above bear-trap foundations, extending to a depth of 12 to 14 feet below level of pass sill, or practically to bottom of concrete foundation. Approximately 300 cubic yards of small stone, with a covering of 575 cubic yards of large stone, were deposited in the depression.

During September and October, 1907, a part of the force was engaged for a short time in constructing an automatic water gauge at the Point Bridge, Pittsburg, for the United States Weather Bureau.

[a] Emergency.

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The following table shows the dates on which dam was raised and lowered during the year:

Raised.	Lowered.	Days up.
Up at beginning of fiscal year	July 11, 1907	11
July 15, 1907	July 18, 1907	3
July 22, 1907	October 29, 1907	99
November 14, 1907	December 11, 1907	27
June 4, 1908	June 11, 1908	7
June 12, 1908		18
Total		165

Lock and Dam 2.—The dam at this lock is not yet completed, but the status of the work is such that all traffic must pass through the lock which has been operated during the year by a regular operating and care force.

The force, when not engaged in duties pertaining to locking operations or necessary repairs, was employed distributing slag and other material furnished and unloaded by the Pennsylvania Railroad Company to make the required fill behind the land walls.

The dam being in an uncompleted state, the upper gates were entirely out of water and the opportunity was taken to clean and paint them. The exposed parts of the lower gates were also cleaned and painted.

An eddy exists at the lower entrance to the lock, principally due to the uncompleted condition of the dam. This eddy causes a deposit in this locality which necessitates occasional dredging in order to maintain a sufficient depth of water for navigation purposes. About 1,000 cubic yards of material were dredged by an orange-peel bucket and deposited as filling behind the lower guide wall. About 11,610 cubic yards of shale rock and gravel were dredged below the lower entrance and scowed away, in order to provide a navigable depth between the lock and the lower end of Sixmile Island.

The only period the lock was closed to navigation, except on account of ice or high water, was between 2.30 p. m. April 21 and 12 midnight April 22. This suspension was caused by the breaking of the anchorages of the lower land gate, allowing the gate to drop down and out into the lock chamber until stopped and held at about an angle of 45° with the vertical by the fleet of flats in the lock. It was hauled back to a vertical position, the toe lifted and new anchorage straps put on. The immediate cause of the breakage was a glancing blow struck the gate by the forward end of a tow passing downstream while the gate was open, but the anchorage that broke first had a defective weld in it which reduced effective section of this 3-inch bar nearly one-half.

Lock and Dam 3.—This lock was operated during the year at such times as there was sufficient water over the upper sill to allow craft to pass. Until the reconstruction of the abutment had progressed to such an extent as to prevent it, a great many small craft, rafts, etc., passed around the end of dam in the channel made at the time of the failure of the abutment in January, 1907. Some craft passed through the gap that was blown in the dam at the same time.

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The force, when not engaged in duties of locking, cleaning, and painting the upper and lower gates, put in 235 linear feet of tile drainpipe from the lock houses to the river, placed screens on the two filling conduits, and made other minor repairs about the lock.

About 1,500 cubic yards of sediment were dredged and scowed away from the upper entrance to the lock, and an old dredge-boat hull was blasted and removed from the same locality. Above the dam 2,865 cubic yards of material were dredged and placed above the abutment end of the dam as embankment.

ALLOTMENTS FROM ACT OF JULY 5, 1884.

January 9, 1903	[a] $9,610.00	January 24, 1907	[c] $60,000.00
July 20, 1903	[a] 18,292.64	February 24, 1907	[c] 20,000.00
July 22, 1904	[a] 16,996.96	July 31, 1907	[d] 34,319.90
November 21, 1904	[b] 5,700.00	May 2, 1908	[d] 880.00
February 10, 1905	[b] 3,000.00	Received from other sources	16.00
April 13, 1905	[b] 6,000.00		
July 27, 1905	[c] 28,657.86		
July 23, 1906	[c] 21,720.81	Total	225,194.32

Statement of expenditures for operating and care of locks and dams, Allegheny River, Pennsylvania, during the fiscal year 1908.

Item.	Amount.
Salaries and wages of regular hired labor force	$21,759.[illegible]
Miscellaneous repairs	32,972.[illegible]
Miscellaneous supplies and services	3,[illegible]
Contingencies	3,415.[illegible]
Total	61,574.[illegible]

COMMERCIAL STATISTICS.

Lockages made and traffic passed at Allegheny River locks during the calendar year ending December 31, 1907.

At dams—	Lockages.	Steamboats.	Coal boats, barges, flats, and boat bottoms.	Rafts.	Other craft.
	Number.	*Number.*	*Number.*	*Number.*	*Number.*
1	1,984	3,299	3,573	133	[illegible]
2	1,085	445	852	25	[illegible]
3	187	35	225	96	[illegible]
Aggregate	3,256	3,779	4,650	254	1,7[illegible]

At dams—	Coal.	Wood.	Iron products.	Sand.	Gravel.	Stone.	Brick.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1	209,140	.....	99	110,794	72,379	4,432	[illegible]
2	122,324	145	277	215,514	789	732	.....
3	36	.....	105	.....	.....	421	.....
Aggregate	331,500	145	481	326,308	73,168	5,585	[illegible]

[a] Lock and Dam 1.
[b] Lock and Dam 3.
[c] Locks and Dams 1 and 3.
[d] Locks and Dams 1, 2, and 3.

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Lockages made and traffic passed at Allegheny River locks during the calendar year ending December 31, 1907—Continued.

At dams—	Timber.	Lumber.	Lath.	Posts.	Braces.	Ties (railroad).	Tan bark.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1	18,606	3,831	78	10,250	1,000	7,270	225
2	2,756	3,313	136	74,690	3,904	350	345
3	17,682	4,222	146	5,390	444	.....	338
Aggregate	39,044	11,366	360	90,330	5,348	7,620	908

At dams—	General merchandise.	Farm, dairy, and orchard products.	Barges (new).	Boat bottoms (new).	Total tonnage.	Passengers.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Number.*
1	132	225	2,052	2,320	443,109	2,367
2	190	.....	1,412	1,432	428,309	513
3	.....	.....	.....	.....	28,784	1,734
Aggregate	322	225	3,464	3,752	900,202	4,614

F F 7.

IMPROVEMENT OF OHIO RIVER, PENNSYLVANIA.

LOCK AND DAM 3.

CONDITION OF WORK AT BEGINNING OF FISCAL YEAR.

The lock, including gates and operating machinery, was nearly completed and the lock-operating plant practically installed; a power house and two lock houses were completed; the chanoine dam was completed except placing 69 props and 132 wickets; construction of two bear-trap gate foundations was nearly finished and the lower leaves of the gates partly constructed; to meet the requirements of a 9-foot navigation, the land lock wall had been raised 30 inches and the lower guide wall 4 feet.

OPERATIONS DURING THE FISCAL YEAR.

The Ohio River Contract Company, contractor both for building 100 linear feet of navigable pass, etc., and the bear-trap gates, continued operations under these contracts, completing the entire work in April, 1908. Numerous rises greatly delayed operations during the entire year, and on one occasion, in November, 1907, so seriously injured the main cofferdam as to require two weeks' repairs to restore it to normal condition. During the working season of 1907 the bear-trap gates, each 94 feet 4 inches wide between pier undercuts, were practically completed and a small amount of protection stone placed above and below them. Thereafter during the winter the cofferdam was removed and the remainder of the protection stone put in place.

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The quantities of material placed during the year and prices paid were as follows:

Building about 100 feet of chanoine dam, two bear-trap dam foundations, and a chanoine weir 160 feet long, three piers, and abutment.

Item.	Designation.	Quantities.	Price per unit.
Wrought iron and steel	Pounds	1,599	$0.08
Cast iron	do	6,668	.05
Concrete	Cubic yards	126	8.50
Stone crib filling	do	250	3.00
Large stone	do	2,208	3.00
Common filling	do	578	.75

Building and erecting in place two bear-trap gates.

Item.	Designation.	Quantities.	Price per unit.
Oak timber	Feet B. M	46,000	a $100.00
Bronze	Pounds	2,224	.50
Cast iron	do	8,083	.035
Wrought-iron bolts, spikes, etc	do	10,359	.035
Steel castings	do	80,276	.12
Wrought steel	do	617,428	.03
Painting ironwork of gates	Lump sum		1,500.00

a Per thousand.

The erection of the steel lock gates, under contract with Lawrence D. Weaning, of Cleveland, Ohio, was completed.

The installation of two 85-brake horsepower gas engines, under a contract with the Westinghouse Machine Company, of Pittsburg, Pa., and two 2-stage air compressors of 500 cubic feet free air per minute capacity each, under a contract with the Blaisdell Machinery Company, Bradford, Pa., was completed. In order to provide ample starting air capacity, a small gas engine and air compressor for that purpose were furnished and installed by the Westinghouse Machine Company, replacing the small belt-connected pumps previously installed.

Under a contract with the Ohio River Contract Company, 2,150 cubic yards of gravel were removed from a small bar above Dam 3, and the material deposited around the lock.

The Ohio River Contract Company, under a contract for excavating and paving floor of lock chamber, completed the excavation, and delivered and placed the paving. About 8,183 tons of stone were used in this work.

Hired-labor operations, in addition to care of floating and fixed plant, were as follows: Poiree needle coffer dams were constructed across ends of lock chamber and the lock unwatered to permit of paving lock floor; the remainder of the old horse boxes were removed and replaced with new ones; the remainder of the horses and props and all except 12 of the wickets in navigable pass were put in place; the placing of steel cover plates on lock gate and other recesses at lock and on bear-trap piers was completed and the cover plates painted; the installation of lock-gate operating machinery was finished and water, air, and gas lines at lock laid; an attempt was made to inclose with a coffer dam a small section of movable dam foundation in order to repair the air line between power plant and

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bear-trap piers, which, however, failed, owing to continuous high water; vertical grooves for temporary bulkheads were cut in lock-gate recess walls.

At the close of the year this structure was practically finished except filling the lock grounds, protecting the lower portions with a concrete covering, and building the necessary walks and steps. It was placed in commission February 1, 1908.

LOCK AND DAM 4.

CONDITION OF WORK AT BEGINNING OF FISCAL YEAR.

The lock, including gates, was practically completed except installation of lower lock-gate engine; 424 feet of navigable pass foundation was constructed and 170 linear feet of its movable parts placed; the three bear-trap piers and one bear-trap foundation were completed and construction of foundation for second bear trap commenced; the Chanoine weir was finished and 80 per cent of the abutment built; a power house and two lock houses were completed; and the hired-labor force had removed about two-thirds of timber facing of land wall of lock preparatory to replacing same with reenforced concrete and raising lock wall 30 inches to meet the requirements of a 9-foot navigation.

OPERATIONS DURING THE FISCAL YEAR.

Baker and Egan, contractors for building 352 linear feet of Chanoine dam, and the Baker Contract Company, contractor for building 98 feet of chanoine dam, etc., and two bear-trap gates, having failed, the work was conducted by the Colonial Trust Company, of Pittsburg, receiver for contractors. The season was an unfavorable one, owing to frequent rises which greatly delayed the progress of the work.

The month of July, 1907, was devoted to repairing and unwatering coffer dam, removing débris from inclosure and materials placed therein late in the previous season, but not erected. Several bent bear-trap beams were returned to structural steel shop for straightening and repairs. During the remainder of the working season of 1907 generally satisfactory progress was made, and by the middle of December practically all of the construction work of dam foundation, movable parts of Chanoine dam and bear-trap gates were completed except placing protection stone above and below dam. This stone was placed during the winter, coffer dams removed, and the work completed in March, 1908.

The total quantities of material placed under above contracts and the prices paid were as follows:

Building two bear-trap gates.

Item.	Designation.	Quantities.	Price per unit.
Oak timber	Feet B. M	44,405	[a] $100.00
Bronze	Pounds	2,249	.50
Cast iron	do	7,848	.06
Wrought-iron bolts, spikes, etc	do	8,055	.065
Steel castings	do	79,059	.10
Wrought steel	do	590,731	.08
Painting gates	Lump sum		1,500.00

[a] Per thousand.

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Building 352 feet of chanoine dam.

Item.	Designation.	Quantities.	Price per unit.
Excavation	Cubic yards	5,800	$0.80
Hemlock timber	Feet B. M	146,676	a 50.00
Oak timber	do	151,743	a 85.00
Cast iron	Pounds	60,649	.05
Cast iron furnished by United States	do	69,773	.0175
Medium steel	do	175,009	.07
Medium steel furnished by United States	do	89,480	.0175
Bolts and washers	do	25,969	.05
Concrete	Cubic yards	2,665	6.00
Reenforcing steel	Pounds	83,510	.05
Stone filling (crib)	Cubic yards	2,730	3.00
Stone filling below dam	do	1,085	3.00
Common filling	do	730	.60
Driftbolts	Pounds	20,422	.05
8-inch galvanized-iron pipe	Linear feet	704	.75
4-inch galvanized-iron pipe	do	352	1.00
Sheet piling	Feet B. M	45,012	a 90.00
White-oak piles	Number	792	10.00

a Per thousand.

Building about 98 feet of chanoine dam, two bear-trap dam foundations, and a chanoine weir 160 feet long, three piers, and abutment.

Item.	Designation.	Quantities.	Price per unit.
Excavation	Cubic yards	28,052	$0.80
Hemlock timber	Feet B. M	234,170	a 55.00
Oak timber	do	98,220	a 90.00
Wrought iron and steel	Pounds	466,493	.05
Cast iron	do	212,792	.05
Galvanized-iron pipe, 4-inch	Linear feet	682	1.00
Galvanized-iron pipe, 3-inch	do	1,628	.75
Black pipe, 2-inch	do	156	.50
Round piling	do	29,587	.65
Sheet piling	Feet B. M	121,831	a 90.00
Concrete	Cubic yards	11,474	5.00
Stone crib filling	do	4,191	3.00
Large stone	do	2,880	3.00
Common filling	do	512	.60
Crib decking	Feet B. M	99,200	60.00

a Per thousand.

The Westinghouse Machine Company, of Pittsburg, Pa., completed the installation under its contract of two 85-brake horsepower gas engines, including also a small gas engine and air compressor for providing an ample supply of starting air. Two 2-stage air compressors of 500 cubic feet free air per minute capacity each were completed under contract with Blaisdell Machinery Company, of Bradford, Pa.

The following work was performed by hired labor: Trestle cofferdams were constructed across lock, lock chamber unwatered, balance of timber facing removed from land wall and wall faced with an 18-inch veneering of steel reenforced concrete, and rough stone paving placed in floor of lock; upper gate recess walls were repaired, and lock gate tracks straightened; remainder of horses and props and 41 wickets were placed in 424-foot section of navigable pass of dam; placed movable parts in 250-foot adjoining section of pass, and placed service bridge at weir; raised land wall of lock 30 inches and reset coping; raised lower guide wall 4 feet; laid gravity water line from upper gate recess to pump well; built lower gate engine pit, and placed part of gate-operating gearing and installed engine; repaired

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pipe lines in conduit underneath lock and laid gas lines from power house to gate recesses for lighting lock and grounds; placed and painted cover plates on lock walls; erected compressed-air storage tank at power house, and removed temporary cofferdams and cleared lock of débris and sedimentary deposits.

The season being far advanced and the contractor's progress on bear trap No. 1 being unsatisfactory, the completion of that portion of the work was undertaken by the Government's hired labor force on November 16 and the bear-trap gate completed early in December.

At the close of the year the construction work was finished except filling of lock grounds, concrete paving protection of same at lower level, and cement walks and steps. The structure was placed in commission February 1, 1908.

LOCK AND DAM 5.

CONDITION OF WORK AT BEGINNING OF FISCAL YEAR.

The lock was practically completed, the navigable pass about completed, the abutment and weirs, except one bear-trap gate, were completed; work on completion of dam and bear-trap gates was under way. The power house and two lock-keepers' houses were completed.

OPERATIONS DURING THE FISCAL YEAR.

The Dravo Contracting Company, under contract, completed 303 feet of chanoine dam, two bear-trap dam foundations, a chanoine weir, three piers, and abutment, the following being a statement of the materials placed and the work done and the prices paid therefor during the fiscal year:

Item.	Designation.	Quantities.	Price per unit.
Excavation	Cubic yards	354	$0.70
Cast iron	Pounds	1,810	.05
Wrought iron	do	2,548	.07
Bronze	do	63	.40
Concrete	Cubic yards	69	7.50
Riprap stone	Tons	141	2.25
3-inch galvanized-iron pipe	Linear feet	141	1.00

Under contract with the same company the second bear-trap gate was completed. The following is a statement of the materials placed and work done under this contract for the second gate and the cost thereof in unit quantities:

Item.	Designation.	Quantities.	Price per unit.
Oak timber	Feet B. M.	22,389	*$100.00
Bronze	Pounds	1,224	.60
Cast iron	do	3,723	.07
Wrought iron	do	3,527	.08
Steel castings	do	39,479	.10
Wrought steel	do	294,785	.0825
Painting ironwork of two gates	Lump sum		1,500.00

* Per thousand.

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The permanent power plant, consisting of two 85-brake horsepower gas engines, furnished under contract with The Westinghouse Machine Company, of Pittsburg, Pa., and two 2-stage air compressors of 500 feet free air per minute capacity each, furnished under contract with the Blaisdell Machinery Company, of Bradford, Pa., were installed.

Under verbal agreement with The Dravo Contracting Company, of Pittsburg, Pa., 723 tons riprap were placed as protection along above the bear trap and chanoine weir foundations.

To secure the foundation of the lower guide wall 24,360 feet B. M of sheet piles were driven along the outside of the wall for a distance of 290 feet and 70 cubic yards of concrete were placed under the toe of the wall for a distance of 300 feet.

The remaining 59 wickets were placed in the navigable pass.

The dam and bear-trap gates were raised for the first time November 21, 1907, and the lock used for navigation November 21 to 23, 1907.

At the close of the year construction work was finished, except filling of lock grounds and cement paving and sidewalks. The lock and dam were practically placed in operation November 21, 1907.

LOCK AND DAM 6.

CONDITION OF WORK AT BEGINNING OF FISCAL YEAR.

The lock and dam were completed for 6-foot navigation and put in operation August 3, 1904. The plant for lowering the sill for 9-foot navigation was being assembled.

OPERATIONS DURING THE FISCAL YEAR.

The season for this work was unfavorable because of the continued high stages of water during the months of May, June, and July, and also in November.

The Penn Bridge Company, under contract, completed the removal of the lower lock gate and the building and erecting of a new gate in its place.

Contract price removing old gate	$1,900
Building and erecting in its place one new lock gate	21,390

The gate track for its length of 235 feet, including the Poiree dam foundation across the lock, 110 feet in length, was lowered 3 feet. The entire lock chamber area, including the Poiree dam foundation in the lock below the upper gate track, the sill crib in front of the filling valves of the lock, and the rock ledge along in front of a part of the land wall foundation, was excavated to the reference of the new elevation of lower lock sill. The following materials were excavated:

Item.	Designation.	Quantities.
Rock	Cubic yards	38
Concrete	do	1,98
Earth	do	2,48

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Concrete to the amount of 724 cubic yards was replaced around timber and sills of the gate track and Poiree dam foundations.

The work of lowering lock sill for 9-foot navigation was practically completed January 11, 1908.

LOCK AND DAM 7.

The site for this dam has been secured. The preparation of plans for the lock and dam was continued at intervals during the year, and is still in progress. No further appropriation was made by Congress at its last session for this work.

Harbor lines, Ohio River, Pennsylvania.—This work was in local charge of Mr. H. C. Gould, assistant engineer, during the fiscal year.

The location on the maps of the lines in the upper half of pool 4 (Shannopin to Glenosborne) was nearly completed early in October, 1907. Circular notices dated October 9 were sent to interested parties asking inspection of proposed locations. A public hearing for final consideration of the lines in the upper half of this pool was held November 12. After some further revision, the maps (7 sheets, Nos. 16 to 22) showing the recommended lines in all of pool 4 were forwarded to the Department with report dated January 29, 1908.

On account of the retirement of Brig. Gen. G. J. Lydecker, U. S. Army, the completion of maps showing the harbor lines in pool 5 (Legionville to Rochester) was taken up in this office. Descriptive notes giving detailed description of the lines were added to the map, which was forwarded to the Department with final report on February 28, 1908.

Estimate for the fiscal year 1910.—The estimate of $375,000 for additional appropriation that can be profitably expended in the fiscal year 1910 includes $300,000 to begin construction of Lock and Dam 7, and $75,000 to complete the construction of Locks and Dams 2, 3, 4, and 5. It is very important that provision be made at once for No. 7. This work will connect the ones above with No. 8, which is now being built, and will materially increase the number of days in the year that boats from the Pittsburg district can reach the open river navigation on the Ohio River.

The item of $75,000 for Nos. 2 to 5, inclusive, is in addition to the estimates hitherto authorized for these works. When the last revision of these estimates was made, and the amount required to complete the works was appropriated, waste material was being delivered free to fill the lock grounds, and it was thought that no special appropriation would be required for this purpose. The diminution of industrial activity, however, has greatly lessened the amount of such waste materials to be disposed of, and they can not be obtained now in any considerable quantity without paying the cost of handling them. The filling is required to remove the present unsightly appearance of the works and to provide the elevation of ground back of the locks and around the buildings that is necessary for their proper care and operation.

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Money statements.

CONSOLIDATED.

July 1, 1907, balance unexpended		$533,275.64
Amount received from sale of condemned property	$439.29	
Amount received from sale of blueprint maps	11.85	
Refundment of overpayment	.10	
		451.24
		533,726.88
June 30, 1908, amount expended during fiscal year for works of improvement		501,982.43
July 1, 1908, balance unexpended		31,744.45
July 1, 1908, outstanding liabilities		221.88
July 1, 1908, balance available		31,522.57
Amount (estimated) required for completion of existing project		1,027,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement (Dams 2–5 and 7), in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.		375,000.00

DAMS 2, 3, 4, AND 5.

July 1, 1907, balance unexpended		$454,749.62
Amount received from sale of condemned property	$422.94	
Amount received from sale of blueprint maps	11.85	
Refundment of overpayment	.10	
		434.89
		455,184.51
June 30, 1908, amount expended during fiscal year for works of improvement		436,264.74
July 1, 1908, balance unexpended		18,919.77
July 1, 1908, outstanding liabilities		221.88
July 1, 1908, balance available		18,697.89
Amount (estimated) required for completion of existing project		75,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		75,000.00

DAM 6.

July 1, 1907, balance unexpended		$72,453.29
Amount received from sale of condemned property		16.35
		72,469.64
June 30, 1908, amount expended during fiscal year for works of improvement		64,400.34
July 1, 1908, balance unexpended		8,069.30

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DAM 7.

July 1, 1907, balance unexpended	$6,072.73
June 30, 1908, amount expended during fiscal year for works of improvement	1,317.35
July 1, 1908, balance unexpended	4,755.38
Amount (estimated) required for completion of existing project	[a] 952,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	300,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1907.

APPROPRIATIONS.

September 19, 1890, construction of Lock and Dam No. 6	$250,000.00
July 16, 1892, construction of Lock and Dam No. 6, and purchase of land for No. 2	100,000.00
August 18, 1894, construction of Lock and Dam No. 6	75,000.00
March 2, 1895, construction of Lock and Dam No. 6	150,000.00
June 3, 1896:	
Construction of Lock and Dam No. 6	25,000.00
Construction of Locks and Dams Nos. 2, 3, 4, and 5, and purchase of sites for Nos. 3, 4, and 5	30,000.00
June 4, 1897:	
Construction of Dams Nos. 2, 3, and 4	400,000.00
Construction of Dam No. 6	300,000.00
July 1, 1898, continuing construction of Dams Nos. 2, 3, 4, and 5	595,000.00
March 3, 1899, continuing construction of Dams Nos. 2, 3, 4, and 5	400,000.00
June 6, 1900, continuing construction of Dams Nos. 2, 3, 4, and 5	595,000.00
June 13, 1902:	
Continuing construction of Locks and Dams Nos. 2, 3, 4, and 5	100,000.00
Completing Lock and Dam No. 6	175,000.00
Construction of Lock and Dam No. 7	23,000.00
March 3, 1903, continuing construction of Dams Nos. 2, 3, 4, and 5	300,000.00
March 3, 1905, completion of Locks and Dams Nos. 2, 3, 4, and 5, and the modification of said locks and dams and of Lock and Dam No. 6 so as to secure a stage of 9 feet in the pools belonging thereto	500,000.00
June 30, 1906, for continuing improvement by the completion of Locks and Dams Nos. 2, 3, 4, and 5, and the modification of said locks and dams and of Lock and Dam No. 6 so as to secure a stage of 9 feet in the pools belonging thereto	1,281,376.00
March 2, 1907, lowering of sill of Lock No. 6	70,000.00
Received from other sources	15,684.78
Total	5,385,060.78

CONTRACTS IN FORCE.

BUILDING ABOUT 100 FEET OF CHANOINE DAM, 2 BEAR-TRAP DAM FOUNDATIONS, EACH 93 FEET LONG, AND A CHANOINE WEIR 160 FEET LONG, 3 PIERS AND ABUTMENT, DAM NO. 3, OHIO RIVER.

Contractor: The Ohio River Contract Company, Evansville, Ind.

Rates: Excavation, 80 cents per cubic yard; hemlock timber, $50 per M feet B. M.; oak timber, $80 per M feet B. M.; wrought iron and steel (including all metal except cast iron, bronze, and pipe), 6 cents per pound; cast iron, 6 cents

[a] For 6-foot project.

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per pound; bronze, 50 cents per pound; galvanized-iron pipe, 4-inch diameter, $1 per linear foot; galvanized-iron pipe, 3-inch diameter, 90 cents per linear foot; black pipe, 2-inch diameter, 50 cents per linear foot; round piling, 65 cents per linear foot; sheet piling, $90 per M feet B. M.; concrete, $8.50 per cubic yard; stone crib filling, $3 per cubic yard; large stone, $3 per cubic yard; common filling, 75 cents per cubic yard; paving, vitrified brick, $3 per square yard; crib decking, $60 per M feet B. M.

Date of approval: June 10, 1905.

Date of beginning work: July 3, 1905.

Date of expiration: October 31, 1906 (extended for a reasonable period).

BUILDING AND ERECTING IN PLACE TWO BEAR-TRAP GATES AT DAM NO. 3, OHIO RIVER.

Contractor: The Ohio River Contract Company, Glenosborne, Pa.

Rates: Oak timber, $100 per M feet B. M.; bronze, 50 cents per pound; cast iron, 6½ cents per pound; wrought iron, bolts, spikes, etc., 6½ cents per pound; painting ironwork of two gates, $1,500; steel castings, 12 cents per pound; wrought steel, 8 cents per pound.

Date of approval: August 18, 1905.

Date of beginning work: August 30, 1905.

Date of expiration: September 18, 1906 (extended for a reasonable period).

BUILDING AND ERECTING IN PLACE TWO STEEL LOCK GATES AT LOCK NO. 3, OHIO RIVER.

Contractor: Lawrence D. Weaning, Cleveland, Ohio.

Rates: Timber, $65 per M feet B. M.; bronze, 38 cents per pound; cast iron, 5.9 cents per pound; steel castings, 8.4 cents per pound; wrought steel (including all material except as enumerated above), 6.7 cents per pound; painting ironwork of two gates, $900.

Date of approval: September 1, 1905.

Date of beginning work: September 15, 1905.

Date of expiration: July 31, 1906 (extended for a reasonable period).

EXCAVATING IN AND PAVING LOCK CHAMBER AT LOCK 3, OHIO RIVER.

Contractor: The Ohio River Contract Company, Evansville, Ind.

Rates: Riprap stone, $3.25 per ton; excavation, 45 cents per cubic yard.

Date of approval: [a]

Date of beginning work: June 6, 1907.

Date of expiration: August 22, 1907.

BUILDING 352 FEET OF CHANOINE DAM, DAM NO. 4, OHIO RIVER.

Contractor: Baker & Egan, Pittsburg, Pa.

Rates, original contract: Excavation, 80 cents per cubic yard; hemlock timber, $50 per M feet B. M.; oak timber, $85 per M feet B. M.; cast iron, 5 cents per pound; cast iron, furnished by the United States, 1¾ cents per pound; medium steel, 7 cents per pound; medium steel, furnished by the United States, 1¾ cents per pound; bolts and washers, 5 cents per pound; concrete, $6 per cubic yard; reenforcing steel, 5 cents per pound; stone filling (crib), $3 per cubic yard; stone filling (above dam), $3 per cubic yard; common filling, 60 cents per cubic yard; driftbolts, 5 cents per pound; 3½-inch galvanized iron pipe, 75 cents per linear foot; 4-inch galvanized iron pipe, $1 per linear foot; sheet piling, $90 per M feet B. M.

Rates, supplemental contract: For change of plan in the dam, the same unit prices to be paid for completed work in place as stated in original contract. The white oak piles, not mentioned in original contract, $10 each in place.

Dates of approval: Original contract, August 13, 1904; supplemental contract, March 22, 1905.

Date of beginning work: August 25, 1904.

Date of expiration: November 1, 1905 (extended for a reasonable period).

[a] Emergency.

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BUILDING ABOUT 98 FEET OF CHANOINE DAM, TWO BEAR-TRAP DAM FOUNDATIONS EACH 93 FEET LONG, A CHANOINE WEIR 160 FEET LONG, THREE PIERS AND ABUTMENT, DAM NO. 4, OHIO RIVER.

Contractor: Baker Contract Company (Incorporated), Pittsburg, Pa.
Rates: Excavation, 80 cents per cubic yard; hemlock timber, $55 per M feet B. M.; oak timber, $90 per M feet B. M.; wrought iron and steel (including all metal except cast iron, bronze, and pipe), 7 cents per pound; cast iron, 6 cents per pound; bronze, 50 cents per pound; galvanized-iron pipe, 4-inch diameter, $1 per linear foot; galvanized iron pipe, 3-inch diameter, 75 cents per linear foot; black pipe, 2-inch diameter, 50 cents per linear foot; round piling, 65 cents per linear foot; sheet piling, $90 per M feet B. M.; concrete, $8 per cubic yard; stone crib filling, $3 per cubic yard; large stone, $3 per cubic yard; common filling, 60 cents per cubic yard; paving, vitrified brick, $3 per square yard; riprap stone bank covering, $3 per cubic yard; crib decking, $60 per M feet B. M.
Date of approval: May 17, 1905.
Date of beginning work: June 9, 1905.
Date of expiration: October 31, 1906 (extended for a reasonable period).

BUILDING AND ERECTING IN PLACE TWO BEAR-TRAP GATES AT DAM NO. 4, OHIO RIVER.

Contractor: Baker Contract Company, Pittsburg, Pa.
Rates: Oak timber, $100 per M feet B. M.; bronze, 50 cents per pound; cast iron, 6 cents per pound; wrought-iron bolts, spikes, etc., 6½ cents per pound; steel castings, 10 cents per pound; wrought steel, 8 cents per pound; painting ironwork of two gates, $1,500.
Date of approval: August 8, 1905.
Date of beginning work: August 21, 1905.
Date of expiration: September 18, 1906.

BUILDING ABOUT 303 FEET OF CHANOINE DAM, 2 BEAR-TRAP DAM FOUNDATIONS, EACH 93 FEET LONG, A CHANOINE WEIR 96 FEET LONG, 3 PIERS AND ABUTMENT, DAM NO. 5, OHIO RIVER.

Contractor: The Dravo Contracting Company, Pittsburg, Pa.
Rates: Excavation, 70 cents per cubic yard; hemlock timber, $50 per M feet B. M.; oak timber, $90 per M feet B. M.; crib decking timber, $55 per M feet B. M.; cast iron, 5 cents per pound; wrought iron and steel (including all metal except cast iron and bronze), 7 cents per pound; bronze, 40 cents per pound; concrete, $7.50 per cubic yard; stone filling (crib), $2.25 per ton; riprap stone, $2.25 per ton; common filling, 50 cents per cubic yard; 3-inch galvanized-iron pipe, $1 per linear foot; 4-inch galvanized-iron pipe, $1.25 per linear foot; 2-inch black iron pipe, 40 cents per linear foot; brick paving, $1.50 per square yard; sheet piling, $95 per M feet B. M.; piling (round or bearing), 60 cents per linear foot.
Supplemental contract providing for change in method of payment.
Dates of approval: Original contract, May 13, 1905; supplemental contract, May 14, 1907.
Date of beginning work: June 4, 1905.
Date of expiration: October 31, 1906 (extended for a reasonable period).

BUILDING AND ERECTING IN PLACE TWO BEAR-TRAP GATES AT DAM NO. 5, OHIO RIVER.

Contractor: The Dravor Contracting Company, Pittsburg, Pa.
Rates: Oak timber, $100 per M feet B. M.; bronze, 60 cents per pound; cast iron, 7 cents per pound; wrought iron, bolts, spikes, etc., 6 cents per pound; steel castings, 10 cents per pound; wrought steel, 8¼ cents per pound; painting ironwork of two gates, $1,500.
Supplemental contract providing for change in method of payment.
Dates of approval: Original contract, August 18, 1905; supplemental contract, May 14, 1907.
Date of beginning work: August 30, 1905.
Date of expiration: September 18, 1906 (extended for a reasonable period).

FURNISHING, DELIVERING, AND INSTALLING IN THE POWER HOUSE AT EACH OF DAMS NOS. 2, 3, 4, AND 5, OHIO RIVER, TWO 85-BRAKE HORSEPOWER GAS ENGINES.

Contractor: The Westinghouse Machine Company, Pittsburg, Pa.
Rate: $29,548.
Date of approval: May 17, 1906.
Date of beginning work: May 21, 1906.
Date of expiration: October 15, 1906 (extended for a reasonable period).

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FURNISHING, DELIVERING, AND INSTALLING IN THE POWER HOUSE AT EACH OF DAMS NOS. 2, 3, 4, AND 5, OHIO RIVER, TWO CHAIN-DRIVEN TWO-STAGE AIR COMPRESSORS.

Contractor: The Blaisdell Machinery Company, Bradford, Pa.
Rate: $11,490.
Date of approval: May 17, 1906.
Date of beginning work: May 21, 1906.
Date of expiration: September 1, 1906 (extended for a reasonable period).

F F 8.

DREDGING POOLS 3, 4, AND 6, OHIO RIVER.

Dredging pool 6.—This work is practically completed, as stated in the Annual Report of the Chief of Engineers, United States Army, for 1907, page 1725. No work was done this fiscal year.

Dredging pools 3 and 4.—This work was in local charge of Capt. F. W. Altstaetter, Corps of Engineers, from the beginning of the fiscal year to March 30, 1908, when it was assigned to Mr. J. W. Arras, assistant engineer. No work was done this fiscal year. It is only partly completed, dredging operations both above and below Dam 3 having been suspended because of interference with the cofferdams of the contractor constructing the dam. It is expected that work will be resumed this season.

Money statements.

CONSOLIDATED.

July 1, 1907, balance unexpended	$4,665.39
July 1, 1908, balance unexpended	4,665.39

DREDGING POOL NO. 6.

July 1, 1907, balance unexpended	$806.84
July 1, 1908, balance unexpended	806.84

DREDGING POOLS NOS. 3 AND 4.

July 1, 1907, balance unexpended	$3,858.55
July 1, 1908, balance unexpended	3,858.55

ALLOTMENTS FROM ACT OF MARCH 3, 1905.

June 12, 1905, for dredging pool 6	$20,800
August 30, 1905, withdrawn and allotted for dredging pools 3 and 4	10,350

F F 9.

OPERATING SNAG BOATS ON OHIO RIVER IN PENNSYLVANIA.

This work is carried on under allotments from the appropriation for operating snag boats on Ohio River. During the fiscal year it continued under local charge of Mr. S. H. Fowler, inspector.

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A number of wrecks occurred during the year at various places, causing dangerous obstructions to navigation. They consisted principally of craft loaded with coal, however, and the owners of the sunken boats generally removed the greater portion of the coal and broke up the wrecks, so that very few were abandoned to be removed by the Government.

Four wrecks and two snags, approximating a total of 1,950 tons, had to be removed by the use of explosives. The United States launches *Wenonah* and *Luzon* were used in this service at the following places along the river:

July 30, 1907.—A large snag in the channel, about one-fourth of a mile above Dam 2 and about 9 miles below the head of the river.

August 6, 1907.—A large snag in the channel below Davis Island dam, about 4½ miles below the head of the river.

September 5, 1907.—A wrecked coal flat in the channel opposite Lashells abutments near Sewickley, Pa., about 12 miles below the head of the river.

September 24, 1907.—A wrecked coal barge in the channel below the Pittsburgh and Lake Erie Railroad Bridge at Beaver, Pa., about 27 miles below the head of the river.

February 11, 1908.—A wrecked flat near the channel opposite Glenfield, Pa., about 9 miles below the head of the river.

May 26, 1908.—A wrecked coal barge in the channel near Industry, Pa., about 34 miles below the head of the river.

ALLOTMENTS.

July 27, 1905	$3,000.00
July 20, 1906	1,837.64
July 23, 1907	2,500.00
Total	[a]7,337.64

Statement of expenditures for operating snag boats on the Ohio River, Pennsylvania, during the fiscal year 1908.

Item.	Amount.
Services	$1,723.34
Fuel, explosives, and other supplies	162.41
Care and repair of plant	67.96
Total	1,953.71

F F 10.

OPERATING AND CARE OF LOCKS AND DAMS, OHIO RIVER, PENNSYLVANIA.

Lock and Dam 1.—This structure has been operated satisfactorily during the year notwithstanding the floor and movable parts of dam have greatly deteriorated through action of the elements and hard usage during the past twenty-three years. Considerable attention

[a] Of this amount, $1,889.20 reverted to the credit of the appropriations.

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was again given to the renewal of broken and worn-out parts with a view to generally improving the physical condition of the structure. During the past three years the bear-trap gate and nearly 200 Chanoine wickets have been renewed and the dam greatly improved over its previous condition. Practically all of the renewals are made by the regular operating force at times when the movable dam is down and the lock not in operation.

During the early part of the year frequent rises, principally out of the Monongahela River, were responsible for large accumulations of drift, rendering the work of the operating force at times exceedingly laborious. On one occasion four days' successive operations were necessary to accomplish the removal of drift above the service bridge of weir No. 3. Should this trouble occur too frequently it may become necessary to establish some method of permanently disposing of the drift at Dam 1 in order to avoid passing it on from one dam to another.

The steel lock gates, constructed eleven years ago, having suffered much from corrosion and been otherwise injured, especially at the ends, were repaired by unwatering them within their recesses and replacing three posts and a valve frame in the upper gate and two posts and a valve and frame in the lower gate. At the same time two of the main 4½-foot emptying valves in lower gate recess wall were repaired and a filling valve of same diameter in upper recess wall, and several of the connecting rods for the operation of those valves replaced with new ones. Material repairs were also made to the lock-operating gearing.

Considerable scour having occurred below weir No. 3, from 1,200 to 1,500 cubic yards of stone from old Lock 1, Monongahela River, and from the piers of the Union Bridge, at Pittsburg, were deposited at that point. Also about 2,500 cubic yards of earth filling were deposited on the lock grounds. The material was delivered by the Pittsburg Transportation Company without cost to the United States and was distributed by the operating force. The remainder of the original timber guide crib below lock having become badly decayed through age, steps were taken toward its removal, the stone filling recovered being used to protect against scour below back-channel dam. Including some light dredging from upper lock approach, 1,050 cubic yards of material were removed at lock. Materials for cofferdam and concrete for extension of lower guide wall were procured and in part delivered at dam. Persistent high water, however, delayed the construction of cofferdam until the close of the year.

In addition to the routine work connected with the care and operation of the lock and dam the following work was performed by the regular operating force: Repairs were made to cut-off dam between Davis and Neville islands where some scour had occurred below apron of dam; the worn-out boiler at lower power house was replaced by a 100-horsepower boiler transferred from Lock 5; a new screw and shaft were placed in steam launch *Wenonah* and material repairs were made to machinery; some new steam and water lines were laid on lock grounds; a new pump well for supplying water for hydraulic machinery was constructed at rear of lower lock gate recess; 10 pass and 10 No. 3 weir wickets were constructed from materials prepared at Government sawmill at Lock 4, Monongahela River; new gate was made and placed in drift chute of upper gate recess; more than

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one-half of temporary dam on foundation of Chittenden dam in back river channel was rebuilt; maneuvering boat was docked and repaired; old pile-driver hull was converted into temporary derrick boat and a set of new flues were placed in boiler used thereon; tug levers similar to those in use on later construction of lock gates were placed on lock gates of Dam 1; and temporary timber decking and new chains were placed on service bridge of weir No. 3.

Before raising the dam in the season of 1908, 4 horses and 24 wickets were removed from pass and weirs and replaced with new ones.

The establishment of Pool 2 and its maintenance during the year has increased materially the number of lockages and transportation business at Lock 1.

During the year the dam was maneuvered as follows:

Raised.	Lowered.	Days up.
Up at beginning of year	July 3, 1907	3
July 6, 1907	July 12, 1907	6
July 17, 1907	July 17, 1907	0
July 30, 1907	August 25, 1907	26
August 29, 1907	September 12, 1907	14
September 15, 1907	October 6, 1907	21
October 14, 1907	October 29, 1907	15
November 16, 1907	November 26, 1907	10
December 2, 1907	December 11, 1907	9
June 10, 1908		20
Total		124

Lock and Dam 2.—This structure has been in operation since October 13, 1906, and considering the length of the Chanoine wickets has given entire satisfaction. Since being placed in commission the dam has been raised and lowered eleven times, involving practically all of the conditions to which movable dams on the upper Ohio River are subjected, except a pool condition below dam or large quantities of ice above it. In every respect the 17-foot 10½-inch wickets have operated as satisfactorily as the 12 to 14 foot wickets on the older dams, except that they are somewhat wabbly owing to the lighter construction of horses and props originally designed for a 6-foot navigation and subsequently lengthened to meet the requirements of the 9-foot depth. They have not been found to be particularly more difficult to lower, but are somewhat harder to raise, owing to the greater load, necessitating, however, only the provision of sufficient power for its accomplishment. During the year 4 horse boxes, 2 horses, 5 props, and 3 wickets were repaired and replaced, which is not considered an unusual number, considering the dimensions of movable parts in use on so large a dam.

There were accomplished in addition to the usual work in connection with operation and care of dam, the placing and painting of all cover plates on lock walls, furnished under contract with the Penn Bridge Company, Beaver Falls, Pa.; installation of pump for operating lock-gate valves by means of oil; replacing of tubes in maneuvering boat boiler; making wicket hooks for new dams approaching completion; placing of snubbing posts on bear-trap piers and abutment; reconstruction and repair of 9 props and 3 horses for wickets; installation of compressed-air storage tank at main power plant; lay-

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ing of concrete floors in lock-house cellars, and setting up of lock-house furnaces, etc. The Pittsburg Transportation Company deposited on the lock grounds, without cost to the United States, six flat loads of earth, which were distributed by the operating force. After each material rise during the winter the lock gates were moved across the chamber and sedimentary deposits washed out in order to obviate the necessity of unwatering the recesses and removing same by hand and pumps at the beginning of the operating season.

Early in September, 1907, settlement was observed in the lower end monoliths of both bear-trap piers. While raising the gate on the 5th the settlement developed to such an extent that the lower end monolith of right pier separated from main body of pier at top 2¼ inches and that of the left pier from its adjoining monolith at the top about 1 inch. The concrete superstructure of these piers had been built on crib substructures intended and supposed to be resting firmly on bed rock. Upon the assumption, therefore, that the settlement had probably reached its limit, trenches were cut across the piers on either side of the open seams and the detached monoliths anchored to main body of piers by means of heavy angles, tension rods, and anchor bolts. These were carefully placed and grouted and concreted in and the open seams filled with cement grout. After being permitted to set for about ten days the dam was raised, the bear-trap gate operating satisfactorily. The piers until the present time have shown no further indication of settlement. About 50 cubic yards of large stone were placed below the right-hand pier to protect it against further scour. The cost of these repairs was $277.

While the repairs to the bear-trap piers were under way, the stage of water being favorable, all of the 6 by 12 inch oak blocks below the hurters, which interfered seriously with the lowering of the lengthened horses and props for 9-foot navigation, for which the hurters were not originally set, were removed, together with the 8-inch steel angle attached to downstream edge of floor of dam. By reason of their removal the maneuvering of wickets has been rendered much easier and safer for the structure.

Before putting the dam in operation in the season of 1908, there were removed from the lower approach to lock about 1,500 cubic yards of gravel and bowlders, deposited there by the action of the current due to lowering of pool from lock end of dam in the fall of 1907.

The dam was maneuvered as follows during the fiscal year:

Raised.	Lowered.	Days up.
July 7, 1907	July 9, 1907	2
July 31, 1907	August 25, 1907	25
August 31, 1907	September 6, 1907	6
September 30, 1907	October 5, 1907	5
October 15, 1907	October 29, 1907	14
November 17, 1907	November 25, 1907	8
December 2, 1907	December 11, 1907	9
June 7, 1908		23
Total		92

Lock and Dam 3.—This structure was practically completed and assigned to operating and care February 1, 1908. A continuous open-river navigable stage obtained until after June 1, during which period the operating force was engaged principally in overhauling

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operating machinery previously used for construction purposes, making necessary alterations to maneuvering boat theretofore temporarily used as a derrick boat, cleaning recesses in lock walls and bear-trap piers of débris, laying gas lines and placing lights for illuminating lock and grounds, installing compressed-air storage tank 5 by 18 feet at power plant, and otherwise preparing for the raising of dam on arrival of favorable stage of the water.

During the winter large deposits of drift, gravel, and sand accumulated in the lock-gate recesses. After removing considerable of this material from lower recess by means of road scoops the lower gate was moved part way across lock chamber and the remainder of the deposits washed out by the current passing around rear end of gate. A similar process at the upper gate failed of accomplishing its maneuver, and it became necessary to construct a temporary bulkhead across the outer end of recess, unwater the same, and remove the drift and sedimentary deposits by hand, which was completed June 19. The gate was put in successful operation the following day, and the raising of the dam commenced. In performing this work assistance was given by the regular operating forces at Dams 1 and 2. While the gate was being cleared of débris the wickets of the Chanoine weir and part of those of the navigable pass were raised.

A needle flat, wicket needles, and other equipment for operation of the dam were procured.

On June 20 the initial raising of the wickets was undertaken; on the 25th, nineteen days after the river had reached a favorable stage for the purpose, the entire dam was up and Pool 3 established.

Lock and Dam 4.—The construction of this work was practically finished and the lock and dam assigned to operating and care on February 1, 1908.

There was no occasion for raising the dam until after June 10, owing to the prevalence of a continuous open-river navigable stage until that time. The operating force in the meantime devoted itself principally to clearing lock grounds, recesses and walls, etc., of waste material and flood deposits, overhauling operating machinery theretofore used for construction purposes, altering maneuvering boat previously used as a derrick boat, installing lower lock-gate engines, and repairing gate-operating gearing, etc. A small embankment connecting abutment with left bank was made.

After considerable effort the lower lock gate was moved across the lock chamber, the heavy deposits of drift and sediment having first been largely removed by means of road scoops. In the upper gate recess, however, owing to the great quantity of such material, a temporary bulkhead was constructed, the recess unwatered, and the material removed by hand and pumps. This work was about completed June 20.

The initial raising of the wickets was undertaken on June 6, the dam being raised in its entirety on the 30th.

Lock and Dam 5.—The construction work here was practically completed and the lock and dam assigned to operating and care November 21, 1907, when the initial raising of the dam was accomplished. Except such as is usual with all new structures of this kind, no difficulty was experienced in operating the Chanoine wickets and lock gates. When the wickets had been raised and a head of about 3 feet effected, the two bear-trap gates, each 93 feet wide between piers,

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were raised, responding instantly to the hydraulic pressure and air applied, and except for structural interference in the hook grooves, rose nearly to their full height. These gates differ only from those in operation at Dam 1, Allegheny River, in minor details of their construction, except that buckle plates instead of flat plates with internal bracing were used in enveloping the steel framework and in that they are proportioned on the basis of the Chittenden-Powell formula on a ratio of 100 upward lifting force to 66 downward pressure, as against 100 to 80 in the gates of Dam 1, Allegheny River. Their rigidity was amply demonstrated on the occasion of their first raising. The principal interference in the hook grooves occurred at one edge of gate only, the other edge apparently being comparatively free. The upward lifting force was sufficient to remove a cut out of each of the edges of several white oak sheeting timbers of upper leaf, varying in thickness from a thin shaving to perhaps three-fourths of an inch, and in depth about 3 inches, until the gate had reached almost its full height, yet the free edge of the gate apparently went only about 3 inches above the level of the other. During the month of June, 1908, both gates were repeatedly raised and lowered, operating with the greatest facility and giving no evidence of any objectionable features. The raising operation at about pool full is uniformly accomplished in approximately five minutes, the vertical height of the above gate being 13.488 feet. The bear traps at Nos. 3 and 4 are of the same construction and operate with equal facility.

The regular force in addition to its routine work in connection with care and operation of the structure placed lock-gate engine cover plates, made necessary alterations to maneuvering boat, installed air-compressor tank, 5 by 18 feet, at main power plant, laid gas pipe lines and placed street lamps for illuminating lock and grounds, completed service bridge of Chanoine weir, cleared lock grounds of temporary structures used during construction work and remainder of construction plant, etc.

A hot-air furnace and light fixtures were placed in each of the lock houses. The Blaisdell Machinery Company, contractor for furnishing air compressors for movable Dams 2 to 5, inclusive, replaced a defective cylinder in one of the compressors at Dam 5.

During the past year the maneuvers of the dam were as follows:

Raised.	Lowered.	Days up.
November 21, 1907	November 23, 1907	2
June 9, 1908		21
Total		23

Lock and Dam 6.—After raising the movable dam and immediately lowering it at the beginning of the year this structure was placed out of commission to permit of removing lower lock gate, lowering its sill and all Poiree needle dam foundations below line of upper gate and the floor of lock chamber 3 feet, and the erection in place of a new lower gate to provide for a 9-foot navigation in proposed Pool 7. These operations, in which the regular force at the dam assisted, practically occupied the first half of the year, being completed in

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December. After their completion, the regular force dismantled the construction plant, removing all derricks, boilers, engines, pumps, pipe lines, Poiree needles, etc., to a place of safety from the effect of ice and freshets. They also replaced cover plates of lower lock-gate recess and reinstalled and connected gate-operating gearing, enlarged office in power house, constructed cement walks between power house and lock houses, removed sedimentary deposits from lock-gate recesses and overhauled operating machinery and devices in power house and on lock walls.

In May the United States dredge boat removed cofferdam across lower end of lock and some gravel deposits in upper approach to lock, together amounting to about 5,500 cubic yards.

The maneuvering boat boiler being inadequate for the purpose, was replaced by a new boiler of as large dimensions as the engine base would permit, which was installed by the operating force at the lock.

The maneuvers of the dam during the past year were as follows:

Raised.	Lowered.	Days up.
July 1, 1907	July 2, 1907	1
June 8, 1908		22
Total		23

ALLOTMENTS FROM ACT OF JULY 5, 1884.

August 3, 1885	$5,865.00	July 26, 1898	$9,620.71
July 10, 1886	12,015.00	February 7, 1899	3,000.00
January 28, 1887	6,700.00	June 24, 1899	1,200.00
July 1, 1887	12,355.00	July 19, 1899	23,459.69
February 25, 1888	8,500.00	January 13, 1900	3,230.00
July 11, 1888	18,015.00	June 18, 1900	45,000.00
August 20, 1889	12,073.00	July 17, 1900	47,456.07
May 14, 1890	2,000.00	February 26, 1901	2,000.00
July 17, 1890	14,752.00	June 28, 1901	10,000.00
October 7, 1890	14,800.00	July 18, 1901	42,530.54
July 10, 1891	10,338.00	August 8, 1902	23,889.09
July 21, 1892	11,831.48	July 20, 1903	65,107.55
June 27, 1893	1,300.00	July 21, 1904	2,512.21
July 22, 1893	12,253.82	August 3, 1904	[a] 18,500.00
July 18, 1894	12,459.02	July 25, 1905	[b] 41,044.11
May 25, 1895	450.00	July 23, 1906	[b] 30,245.17
July 9, 1895	30,661.54	October 13, 1906	[c] 14,200.00
July 28, 1896	15,531.57	June 21, 1907	[b] 2,500.00
May 17, 1897	1,200.00	August 7, 1907	[d] 110,000.00
July 23, 1897	9,898.62		
November 20, 1897	400.00	Total	[e] 703,894.19

[a] Lock 6.
[b] Locks 1 and 6.
[c] Lock 2.
[d] Locks 1 to 6, inclusive.
[e] Of this amount there was undrawn or deposited $1,010.

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Statement of expenditures for operating and care of locks and dams, Ohio River, Pennsylvania, during the fiscal year 1908.

Item.	Amount.
Salaries and wages of regular hired labor force	$49,997.08
Miscellaneous repairs	10,760.00
Miscellaneous supplies and services	15,289.46
Contingencies	2,673.72
Total	78,700.21

COMMERCIAL STATISTICS.

Traffic through Locks and Dams 1 to 6, inclusive, Ohio River, during the calendar year 1907, as measured by the commerce through Lock and Dam 1.

Commodity.	Number.	Commodity.	Tons.[a]
Packets	1,436	Coal	3,206,727
Towboats	4,101	Iron and steel products	33,955
Model barges	68	Sand	390,015
Coal boats	2,552	Gravel	292,716
Coal barges	5,957	Lumber	21,621
Flats	11,349	Miscellaneous	76,778
Rafts	31		
Miscellaneous	1,600	Total	4,021,888
Total	27,094		

[a] 2,000 pounds.

F F 11.

IMPROVEMENT OF HARBOR AT PITTSBURG, PENNSYLVANIA.

Maintenance.—The navigation channels in the harbor continued in good condition throughout the year. The only dredging done, otherwise than at the entrance to locks, was in the removal of a large bar at mouth of the Try street sewer, Pittsburg, containing about 4,000 cubic yards. This work was done without expense to the United States by a dredging company in return for the privilege of dumping in the river an equal amount of dredged material from other places.

The remains of a steamboat wreck on bar near head of back channel at Brunot Island, Ohio River, was removed by United States dredge *No. 1.*

Inspection.—Patrol of the rivers and banks was maintained throughout the year, preventing improper deposits and stopping same where found.

Inspection of structures, etc., built under War Department permits, and examination of works on the bank near the harbor lines were maintained throughout the year to prevent encroachments.

The work of commercial sand dredgers was under constant supervision to prevent deposit of waste piles and to secure their removal when made.

The boats of one of the largest of the dredging companies left several large piles in the Ohio River near Glenfield, Pa., and their removal was so unduly delayed that some drastic action became nec-

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essary. On authority from the War Department, the permit of this company was suspended and all its work stopped from September 2 to 6, 1907, while they worked with a large force on removal of the piles. This action has had a very beneficial effect on all other dredging, more care being taken to comply with the regulations.

The naphtha launch *Luzon* was kept in commission all the year. Minor repairs to engine were made, hull and cabin were repainted, and closets, wash rooms, etc., in cabin were rebuilt and improved.

Local surveys and maintenance of harbor-line marks.—A new system of triangulation was surveyed on the Monongahela River from Becks Run, Pittsburg, to the Rankin highway bridge, 5 miles, as so many of the old triangulation stations had been disturbed or obliterated by railroad and other construction. The new stations were marked by concrete monuments or brass plates on substantial masonry. Additional reference marks were placed and new construction was located.

The harbor-line markings were examined and renewed where necessary at many places in the harbor.

Changes of harbor lines.—A change of the line on left bank Allegheny River from Lock 2 to the Brilliant pumping station was considered and agreed upon with Pittsburg city officials to give better entrance to the lock. Map showing this change is nearly ready to be forwarded.

Miscellaneous.—The removal of the Union Bridge at mouth of Allegheny River was completed December, 1907, as required by the order of the Secretary of War.

Preliminary maps for a part of the new set of harbor line sheets started last year were prepared of the Monongahela River from the Twenty-second Street Bridge to Duquesne.

Seven applications for permits for various structures in the harbor were examined and reported on.

Twenty measurements of river discharge were made during the year. A number of maps, diagrams, and tabulations were prepared for study as to effect of reservoirs on floods, low-water stages, etc.

Money statement.

July 1, 1907, balance unexpended	$5,612.25
Amount received from sale of blueprint maps	26.15
	5,638.40
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,736.71
July 1, 1908, balance unexpended	1,901.69
July 1, 1908, outstanding liabilities	475.90
July 1, 1908, balance available	1,425.79
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

March 3, 1899	$110,662.90	March 2, 1907	$10,000.00
June 13, 1902	10,000.00	Received from other sources	47.04
June 13, 1902 (allotment June 14, 1904)	5,000.00		
March 3, 1905	10,000.00	Total	149,709.94
November 23, 1906, received by Treasury certificate of transfer settlement	4,000.00		

COMMERCIAL STATISTICS.

Classified statement of river traffic in Pittsburg Harbor for calendar year 1907.

Commodity.	Tons.[a]	Commodity.	Tons.[a]
Barges (new)	2,052	Miscellaneous	87,4[illegible]
Bottoms, coal boat (new)	2,320	Sand	1,600,9[illegible]
Braces, poles, posts, etc	78,594	Steel and iron products, miscellaneous	104,[illegible]
Brick	290	Stone	20,8[illegible]
Coal	10,821,907	Ties, railroad	7,6[illegible]
Coke	1,875	Timber	23,3[illegible]
Farm products	1,811		
General merchandise	25,716		
Gravel	1,590,808	Total	14,395,8[illegible]
Lumber	25,011	Passengers ... number	533,2[illegible]
Live stock	1,159		

[a] 2,000 pounds.

NOTE.—The table gives only actual amounts of articles handled, care being taken not to duplicate any items. It should be stated that a very large part of this commerce is stored in the harbor from a week to several months and then rehandled and shipped out and the empties returned. Neither the rehandling nor the return of empties are considered in the table.

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APPENDIX G G.

IMPROVEMENT OF RIVERS AND HARBORS IN THE WHEELING, WEST VIRGINIA, DISTRICT.

REPORT OF CAPT. F. W. ALTSTAETTER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Movable dams in Ohio River.
2. Little Kanawha River, West Virgina.
3. Operating and care of lock and dam on Little Kanawha River, West Virginia.
4. Kanawha River, West Virginia.
5. Operating and care of locks and dams on Kanawha River, West Virgina.

UNITED STATES ENGINEER OFFICE,
Wheeling, W. Va., July 20, 1908.

SIR: I have the honor to transmit herewith the annual report of the works under my charge for the fiscal year ending June 30, 1908.

* * * * * * *

Very respectfully, your obedient servant,

F. W. ALTSTAETTER,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

G G 1.

MOVABLE DAMS IN OHIO RIVER BETWEEN THE PENNSYLVANIA STATE LINE AND CINCINNATI.

OPERATIONS DURING THE FISCAL YEAR ENDING JUNE 30, 1908.

Dam No. 8, about 46 miles below Pittsburg, Pa.—In October, 1907, the contract for constructing lock and guide walls and grading and paving esplanade was completed. These walls and the paving are en-

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tirely of concrete. Supply pipes were placed in lock and esplanade under a separate contract. The following work was accomplished:

Excavation	cubic yards	1,779.5
Concrete	do	2,954.252
Concrete paving	do	699.694
Stone filling	do	2,374.3
Filling	do	7,327.2
Concrete steps	linear feet	576.0
Cast-iron pipe	do	12.0
Galvanized-iron pipe	do	78.88
Iron and steel	pounds	12,803.7
Supply pipes	linear feet	1,949.5

A contract was entered into April 23, 1908, for building 700 feet of navigable pass. Preparations for beginning work were commenced in April. A cofferdam for 375 feet of pass was built and 7,000 cubic yards of material removed for foundation.

In addition to the pass, the weirs and abutment are to be constructed. Until these are built and the lock is furnished with gates and machinery the present work will not benefit navigation.

Dam No. 11, about 77 miles below Pittsburg, Pa.—The construction of lock and guide walls, provided for under contract entered into July 17, 1904, has not progressed satisfactorily, and it will require some months before the work is completed. A separate contract was entered into for placing supply pipes, a part of which was placed. The following work was accomplished:

Timber	feet B. M.	77,120.0
Sheet piles	linear feet	10,966.3
Piles	do	13,263.0
Filling	cubic yards	11,360.0
Concrete	do	11,433.2
Stone filling	do	2,425.0
Excavation	do	6,052.0
Galvanized-iron pipe	linear feet	53.5
Iron and steel	pounds	153,640.0
Supply pipes	linear feet	3,298.3

Preparations for constructing 700 feet of navigable pass were begun in April under contract entered into April 23, 1908. A cofferdam for about 350 feet of pass was built and 5,000 cubic yards of material removed for foundation.

As at No. 8, the weirs, abutment, lock gates, and machinery must be built before navigation will be benefited.

Dam No. 13, about 96 miles below Pittsburg, Pa.—Under contract for building dam, work was commenced in April, 1906, and satisfactory progress made. Provision was made for erecting the bear-trap gates, material for which was furnished under separate contracts.

The following is a statement of work done and material received:

Excavation	cubic yards	15,393.28
Timber	feet B. M.	341,796.79
Iron and steel	pounds	570,359.78
Stone filling	cubic yards	2,903.11
Riprap	do	578.2
Sheet piles	linear feet	8,401.5
Piles	do	18,006.7
Filling	cubic yards	294.78
Rock excavation	do	5.63
Concrete	do	3,288.42
Pipe, etc	linear feet	1,779.0
For bear-trap gates:		
Lumber	feet B. M.	91,242.44
Iron and steel	pounds	208,014.5

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A contract was entered into February 12, 1908, for completing guide walls and power-house foundation, and grading and paving esplanade. Work was begun in March, the following being accomplished:

Excavation	cubic yards	21,584.45
Fill	do	2,261.59
Base for paving	do	1,241.21
Riprap	do	348.15
Piles	linear feet	4,697.0
Sheet piles	feet B. M.	19,710.9
Lumber	do	320.0
Concrete	cubic yards	1,514.09
Sewer	linear feet	465.0
Drain	do	602.0
Manholes	number	2.0
Pipe	linear feet	4,656.0
Iron and steel	pounds	4,945.68

To make the lock and dam at this site available, lock gates, machinery, and buildings must be built in addition to the work already contracted for.

Plans and specifications were prepared for lock gates and power house.

Dam No. 18, about 179 miles below Pittsburg, Pa.—The contract covering the construction of the dam was annulled in May, 1908, the receiver for the contractor having decided not to continue work. Immediate steps were taken to complete the dam by hired labor. The making of preparations for this work required considerable time, as the plant used at that site was in bad condition. The rebuilding of the cofferdam was almost finished, and excavating for weir foundation well under way. The following is a statement of the work done:

Filling	cubic yards	2,700
Excavation	do	9,900
Stone filling	do	1,141
Timber	feet B. M.	22,858
Concrete	cubic yards	2,795
Paving	do	156
Curbing	do	150
Iron and steel	pounds	138,864
Galvanized-iron pipe	linear feet	1,316
Bolt holes	do	39

A service bridge will be constructed in connection with the weir. It was omitted from the original plans for economy, but its necessity has since been shown.

Lumber and part of the irons for both bear-trap gates were delivered. The cement used in the dam was furnished by the Atlas Portland Cement Company under contract.

A contract was entered into October 29, 1907, for dredging approaches to lock and dam. The following material was removed: 55,789 cubic yards of common excavation and 6,088.3 cubic yards of rock.

Plans and specifications were prepared for lock gates, power house, and lock house.

Dam No. 19, about 191 miles below Pittsburg, Pa.—The site for the lock has been changed from the Ohio to the West Virginia side of

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the river. This change was made to better serve navigation interests. Plans and specifications for abutment and power house were prepared. As the Government will furnish the cement, proposals were invited for the construction of the storehouse.

Dam No. 26, about 278 miles below Pittsburg, Pa.—A survey was made and the site for lock and dam located. In locating the site, 135 test holes were drilled, part of them into solid rock. The papers necessary in acquiring land required were prepared and forwarded for approval. Plans were prepared for the abutment and preparations begun for its construction by hired labor. Plans and specifications were prepared for power house and lock houses.

Attention is invited to the advantages of adopting some system for the improvement of the Ohio which would insure a regular rate of progress with a certain number of new dams, say five or ten, begun each year. This would encourage a high class of contractors to prepare for the work, since they would look forward to new work on the completion of their contracts without intervening idle years. It would enable the Government to use employees experienced in the work instead of frequently discharging old, trained employees and later taking on new, untried ones, which results from big fluctuations in the appropriations. This work is of a special nature, is unlike any other in progress, and both contractors and the Government engineering force require some special training on the river before they reach a high state of efficiency.

Normally a year or two is consumed in making location surveys and, after the location is determined, in buying the land and making plans. Actual construction is, therefore, begun about a year or two after the first appropriation is made. If the above method of regular rate of progress be adopted, earlier appropriations for location surveys, etc., must be considered.

Money statements.

DAM NO. 8.

July 1, 1907, balance unexpended	$306,495.86
Amount appropriated by sundry civil act approved May 27, 1908	136,000.00
	442,495.86
June 30, 1908, amount expended during fiscal year for works of improvement	85,663.32
July 1, 1908, balance unexpended	356,832.54
July 1, 1908, outstanding liabilities	955.67
July 1, 1908, balance available	355,876.87
July 1, 1908, amount covered by uncompleted contracts	308,619.00
Amount (estimated) required for completion of existing project	364,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	364,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

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DAM NO. 11.

July 1, 1907, balance unexpended	$424,208.55
Amount appropriated by sundry civil act approved May 27, 1908	200,000.00
	624,208.55
June 30, 1908, amount expended during fiscal year, for works of improvement	112,852.30
July 1, 1908, balance unexpended	511,356.25
July 1, 1908, outstanding liabilities	908.71
July 1, 1908, balance available	510,447.54
July 1, 1908, amount covered by uncompleted contracts	436,448.97
Amount (estimated) required for completion of existing project	300,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	300,000.00

DAM NO. 13.

July 1, 1907, balance unexpended	$423,656.55
Amount appropriated by sundry civil act approved May 27, 1908	60,000.00
	483,656.55
June 30, 1908, amount expended during fiscal year, for works of improvement	169,605.99
July 1, 1908, balance unexpended	314,050.56
July 1, 1908, outstanding liabilities	837.83
July 1, 1908, balance available	313,212.73
July 1, 1908, amount covered by uncompleted contracts	253,486.51
Amount (estimated) required for completion of existing project	240,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	[a] 240,000.00

DAM NO. 18.

July 1, 1907, balance unexpended	$366,669.98
Overpayment	2.00
	366,671.98
June 30, 1908, amount expended during fiscal year, for works of improvement	73,023.65
July 1, 1908, balance unexpended	293,648.33
July 1, 1908, outstanding liabilities	14,266.24
July 1, 1908, balance available	279,382.09
July 1, 1908, amount covered by uncompleted contracts	140,650.47
Amount (estimated) required for completion of existing project	100,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	100,000.00

[a] Of this amount $40,000 is under contract authorization of 1899 and $200,000 under that of 1907.

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DAM NO. 19.

July 1, 1907, balance unexpended	$207,988.36
June 30, 1908, amount expended during fiscal year, for works of improvement	1,859.68
July 1, 1908, balance unexpended	206,128.68
July 1, 1908, outstanding liabilities	458.08
July 1, 1908, balance available	205,670.60
Amount (estimated) required for completion of existing project	725,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	300,000.00

DAM NO. 26.

July 1, 1907, balance unexpended	$234,957.65
Amount appropriated by sundry civil act approved May 27, 1908	110,000.00
	344,957.65
June 30, 1908, amount expended during fiscal year for works of improvement	18,931.72
July 1, 1908, balance unexpended	326,025.93
July 1, 1908, outstanding liabilities	5,752.72
July 1, 1908, balance available	320,273.21
Amount (estimated) required for completion of existing project	855,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	300,000.00

CONSOLIDATED.

July 1, 1907, balance unexpended	$1,963,976.95
Amount appropriated by sundry civil act approved May 27, 1908	506,000.00
Overpayment	2.00
	2,469,978.95
June 30, 1908, amount expended during fiscal year for works of improvement	461,936.66
July 1, 1908, balance unexpended	2,008,042.29
July 1, 1908, outstanding liabilities	23,179.25
July 1, 1908, balance available	1,984,863.04
July 1, 1908, amount covered by uncompleted contracts	1,139,204.95
Amount (estimated) required for completion of existing project	2,584,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	1,604,000.00

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APPROPRIATIONS.

March 3, 1899:	
Construction of Dam No. 13	$50,000
Construction of Dam No. 18	50,000
June 6, 1900, continuing construction of Dams Nos. 13 and 18	470,000
March 3, 1901, continuing construction of Dams Nos. 13 and 18	40,000
June 13, 1902:	
Construction of Lock and Dam No. 8	50,000
Construction of Lock and Dam No. 11	50,000
Construction of Lock and Dam No. 19	25,000
June 28, 1902, continuing construction of Dams Nos. 13 and 18	46,600
March 3, 1903:	
Continuing construction of lock at Dam No. 8	200,000
Continuing construction of lock at Dam No. 11	200,000
Continuing construction of Dams Nos. 13 and 18	450,000
April 28, 1904:	
Continuing construction of Dam No. 8	50,000
Continuing construction of Dam No. 11	50,000
March 3, 1905:	
Completion of locks at Dams Nos. 8 and 11	160,000
Continuing construction of Dams Nos. 13 and 18	100,000
Construction of Lock and Dam No. 19	100,000
Purchase of site for Lock and Dam No. 26	35,000
June 30, 1906:	
Construction of locks at Dams Nos. 8 and 11	160,000
Continuing construction of Dams Nos. 13 and 18	160,400
March 2, 1907:	
Construction of Lock and Dam No. 8	251,845
Construction of Lock and Dam No. 11	198,343
Construction of Locks and Dams Nos. 13 and 18	174,778
Lock and Dam No. 19	200,000
Construction of Lock and Dam No. 26	100,000
March 4, 1907, construction of Dams Nos. 13 and 18	278,000
May 27, 1908:	
Construction of Lock and Dam No. 8	136,000
Construction of Lock and Dam No. 11	200,000
Construction of Dams Nos. 13 and 18	15,000
Construction of Locks and Dams Nos. 13 and 18	45,000
Construction of Lock and Dam No. 26	110,000
Total	4,155,966

NOTE.—Received from sale, $48.62.

Act of March 2, 1907, repealed appropriation of $135,000 made by act of March 3, 1905, and reappropriated this sum for Lock and Dam No. 26.

CONTRACTS IN FORCE.

NAVIGATION PASS FOR DAM NO. 8.

Contractor: The T. A. Gillespie Company.

Rate: Excavation at $1.20 per cubic yard; fill, 90 cents per cubic yard; base for concrete, $4.20 per cubic yard; riprap, $4.20 per cubic yard; round piles, 70 cents per linear foot; sheet piles, 12-inch, $105 per thousand; sheet piles, 4-inch, $105 per thousand; common timber, $80 per thousand; deck timber, $90 per thousand; oak timber, $120 per thousand; concrete, $8.60 per cubic yard; pipe, 3-inch, $1 per linear foot; pipe, 1¼-inch, $1 per linear foot; drip pockets, $30 each; structural steel, 8 cents per pound; reenforcing bars, 6 cents per pound; forgings, 6 cents per pound; bolts, etc., 7 cents per pound; iron castings, 7 cents per pound; steel castings, 8 cents per pound.

Date of approval: May 8, 1908.

Date of beginning: June 10, 1908.

Date of expiration: 200 fair working days.

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LOCK FOR MOVABLE DAM NO. 11.

Contractor: Ætna Construction Company.
Rate: Grubbing and clearing at $200 per acre; timber, $40 per thousand; sheet piling, 50 cents per linear foot; round piling, 40 cents per linear foot; common filling, 30 cents per cubic yard; stone filling, $2.50 per cubic yard; stone steps, $1 per linear foot; common excavation, 65 cents per cubic yard; concrete, $5.35 per cubic yard; white oak timber, $60 per thousand; paving, $ per cubic yard; bolt holes, 50 cents per linear foot; iron and steel, 5 cents per pound; cast-iron pipe, 6-inch, $2 per linear foot; galvanized-iron pipe, 3-inch, $1 per linear foot; galvanized-iron pipe, 1½-inch, 40 cents per linear foot.
Date of approval: July 11, 1904.
Date of beginning: August 11, 1904.
Date of expiration: December 1, 1907. (Time limit waived.)

PIPES, ETC., FOR DAM NO. 11.

Contractor: Kiel Brothers Plumbing and Heating Company.
Rate: Pipe, 4-inch, at $2.25 per linear foot; pipe, 3-inch, $1.10 per linear foot; pipe, 1½-inch, 65 cents per linear foot; pipe, ¾-inch, 45 cents per linear foot; drip pockets, $14.75 each; cocks, ¾-inch, $5 each.
Date of contract: July 3, 1907.
Date of beginning: When notified.
Date of expiration: When notified.

NAVIGATION PASS FOR DAM NO. 11.

Contractor: The T. A. Gillespie Company.
Rate: Excavation at $1.20 per cubic yard; fill, 90 cents per cubic yard; base for concrete, $3.20 per cubic yard; riprap, $3.20 per cubic yard; round piles, 75 cents per linear foot; sheet piles, 12-inch, $100 per thousand; sheet piles, 4-inch, $105 per thousand; common timber, $80 per thousand; deck timber, $90 per thousand; oak timber, $120 per thousand; concrete, $7.10 per cubic yard; pipe, 3-inch, $1 per linear foot; pipe, 1½-inch, $1 per linear foot; drip pockets, $30 each; structural steel, 8 cents per pound; reenforcing bars, 6 cents per pound; forgings, 6 cents per pound; bolts, etc., 7 cents per pound; iron castings, 6 cents per pound; steel castings, 8 cents per pound.
Date of approval: May 8, 1908.
Date of beginning: June 10, 1908.
Date of expiration: 200 fair working days.

MOVABLE DAM NO. 13.

Contractor: The Hollerbach & May Contract Company.
Rate: Common excavation at 65 cents per cubic yard; common filling, 60 cents per cubic yard; stone filling, $3 per cubic yard; riprap, $3 per cubic yard; concrete, $8.10 per cubic yard; oak timber, $80 per thousand; hemlock timber, $60 per thousand; decking, $60 per thousand; sheet piles, 75 cents per linear foot; round piles, 50 cents per linear foot; paving, $6 per cubic yard; curbing, $1 per linear foot; drill holes, under 2 inches in diameter, 50 cents per linear foot; pipe and fittings, $1 per linear foot; reenforcing bars, 5 cents per pound; structural steel, 5 cents per pound; castings, 5 cents per pound; forgings, 5 cents per pound; bolts and miscellaneous iron, 5 cents per pound.
Date of approval: January 29, 1906.
Date of beginning: March 1, 1906.
Date of expiration: 300 fair working days.

SURFACED LUMBER FOR DAM NO. 13.

Contractor: G. Elias & Bro.
Rate: Yellow pine at $41 per thousand; oak, $45 per thousand; cypress water-seal strips, 11½ cents per linear foot; wedges, 2 cents each.
Date of approval: April 1, 1907.
Date of beginning: June 3, 1907.
Date of expiration: August 2, 1907. (Time limit waived.)

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IRON AND STEEL FOR DAM NO. 13.

Contractor: J. & J. B. Milholland Company.
Rate: Structural steel at 3.21 cents per pound; forgings, 8⅝ cents per pound; pins, etc., 12 cents per pound; bolts, etc., 3⅞ cents per pound; steel castings, 10⅝ cents per pound; iron castings, 7 cents per pound; cast-iron counterweights, 2.28 cents per pound.
Date of contract: March 30, 1907.
Date of beginning: April 19, 1907.
Date of expiration: June 28, 1907. (Time limit waived.)

GUIDE WALLS, GRADING, ETC., DAM NO. 13.

Contractor: The Hollerbach & May Contract Company.
Rate: Excavation at 40 cents per cubic yard; fill, 75 cents per cubic yard; base for paving, $3 per cubic yard; riprap, $3.25 per cubic yard; round piles, 50 cents per linear foot; sheet piles, $60 per thousand; lumber, $60 per thousand; concrete, Class A, $7 per cubic yard; concrete, Class B, $7.50 per cubic yard; stone masonry, $10 per cubic yard; pointing stone, $2 per square yard; sewer, 75 cents per linear foot; drain, 50 cents per linear foot; manholes, complete, $100 each; pipe, 4-inch, $1.25 per linear foot; pipe, 3-inch, $1 per linear foot; pipe, 1½-inch, 75 cents per linear foot; steel, 8 cents per pound; forgings, bolts, etc., 8 cents per pound.
Date of approval: February 18, 1908.
Date of beginning: March 25, 1908.
Date of expiration: 150 fair working days.

DREDGING, ETC., DAM NO. 18.

Contractor: Monongahela and Western Dredging Company.
Rate: Common excavation at 17 cents per cubic yard; rock excavation, $1.25 per cubic yard.
Date of approval: November 8, 1907.
Date of beginning: December 11, 1907.
Date of expiration: November 30, 1908.

PORTLAND CEMENT FOR DAM NO. 18.

Contractor: The Atlas Portland Cement Company.
Rate: In duck sacks at $1.568 per barrel; in wood, $1.59 per barrel.
Date of approval: June 20, 1908.
Date of beginning: When notified.
Date of expiration: December 31, 1908.

SAND AND GRAVEL FOR DAM NO. 18.

Contractor: Parkersburg and Marietta Sand Company.
Rate: Sand at 55 cents per cubic yard; gravel, 50 cents per cubic yard.
Date of contract: June 22, 1908.
Date of beginning: July 25, 1908.
Date of expiration: When notified.

COMMERCIAL STATISTICS.

Freight handled at the wharves of some of the principal cities between Dam No. 8, Ohio River, and Ripley, Ohio, during the calendar year 1907.

Name of city.	Freight.	Passengers.
	Tons.	*Number.*
East Liverpool, Ohio	48,450	15,000
Steubenville, Ohio	17,750	10,210
Wheeling, W. Va	138,000	6,900
Glendale, W. Va	20,787	.....
Moundsville, W. Va	5,500	5,000
Parkersburg, W. Va	9,184	8,790
Middleport, Ohio	3,600	3,800
Ashland, Ky	850,000	.....
Ironton, Ohio	18,000	18,456
Portsmouth, Ohio	46,000	18,000

The number of passengers includes excursionists.

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The information contained in the foregoing table was obtained through the mayors of the several cities mentioned. It appears that no accurate record is kept of tonnage and passenger traffic at most of the towns on the Ohio River, and the quantities given in the above table are only approximately correct.

GG 2.

IMPROVEMENT OF LITTLE KANAWHA RIVER, WEST VIRGINIA.

High water prevented the removal of obstructions which had reformed above Burning Springs. It is proposed to clear the channel during the coming year should the river reach a low enough stage.

Bridges, and pipe line, ferry, and wire crossings erected under War Department permits were inspected.

Five hundred dollars can be profitably expended each year on the stretch of river above Burning Springs in clearing the channel. To remove the larger obstructions which seriously interfere with navigation will require about $10,000.

Extensive repairs, authorized by the act of March 2, 1907, were begun at Lock and Dam No. 2 and practically completed. The guide cribs authorized were built.

The repairs to Lock and Dam No. 2 consisted in cutting out old masonry and replacing it with concrete, pointing lock walls, concreting floor of lock, raising lock walls, and rebuilding dam.

High water interfered with the proposed repairs to Lock and Dam No. 1. This work was begun in July, 1907, but little was done. The lower guide crib was built.

Minor repairs were made to Lock and Dam No. 3, so as to prevent interference with navigation through failure of lock and dam. Some of the obstructions were removed from pool No. 2.

The commercial statistics for this river are contained in the report for operating and care of locks and dams on Little Kanawha River, West Virginia.

The funds provided by act of March 3, 1905, for repair of Locks and Dams Nos. 1–4 have proved insufficient for the purpose, and it is now estimated that an additional appropriation of $30,000 will be required to complete the contemplated repair of these structures.

Money statements.

ABOVE LOCK NO. 5.

July 1, 1907, balance unexpended	$1,277.86
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	69.20
July 1, 1908, balance unexpended	1,208.66
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	500.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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PURCHASE AND REPAIR OF LOCKS NOS. 1–4.

July 1, 1907, balance unexpended	$42,297.38
June 30, 1908, amount expended during fiscal year, for works of improvement	34,346.28
July 1, 1908, balance unexpended	7,951.10
July 1, 1908, outstanding liabilities	1,321.34
July 1, 1908, balance available	6,629.76
July 1, 1908, amount covered by uncompleted contracts	375.91

BETTERMENTS, LOCKS NOS. 1–4.

July 1, 1907, balance unexpended	$78,363.73
June 30, 1908, amount expended during fiscal year for works of improvement	12,625.45
July 1, 1908, balance unexpended	65,738.28
July 1, 1908, outstanding liabilities	716.46
July 1, 1908, balance available	65,021.82
July 1, 1908, amount covered by uncompleted contracts	1,232.55

SURVEY.

July 1, 1907, balance unexpended	$500.00
June 30, 1908, amount expended during fiscal year	500.00

CONSOLIDATED.

July 1, 1907, balance unexpended		$122,438.97
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$47,471.73	
For maintenance of improvement	69.20	
		47,540.93
July 1, 1908, balance unexpended		74,898.04
July 1, 1908, outstanding liabilities		2,037.80
July 1, 1908, balance available		72,860.24
July 1, 1908, amount covered by uncompleted contracts		1,608.46
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		500.00

APPROPRIATIONS.

August 14, 1876	$7,300	June 3, 1896	$1,500
June 18, 1878	18,000	March 3, 1899	743
March 3, 1879	18,000	June 13, 1902	1,000
June 14, 1880	15,000	March 3, 1905	1,000
March 3, 1881	40,000	March 3, 1905	163,000
August 2, 1882	31,000	March 2, 1907	81,000
August 5, 1886	16,875		
August 11, 1888	25,000	Total	459,418
September 19, 1890	40,000		

NOTE.—Received from sale, $186.10.

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CONTRACT IN FORCE.

TIMBER AND LUMBER FOR LOCK NO. 3.

Contractor: Nicolette Lumber Company.
Rate. White oak at $27 per thousand; West Virginia pine, $27 per thousand; hemlock, $24 per thousand; white pine, $27 per thousand; poplar, $30 per thousand.
Date of contract: April 14, 1908.
Date of beginning: May 29, 1908.
Date of expiration: July 1, 1908.

G G 3.

OPERATING AND CARE OF LOCKS AND DAMS ON LITTLE KANAWHA RIVER, WEST VIRGINIA.

There is slack-water navigation, for a depth of 4 feet, from Parkersburg (the mouth) to Creston, a distance of 48 miles. The system consists of five locks and fixed dams, Nos. 1 and 3 of which are in bad condition.

Owing to the extensive repairs under way at Lock No. 2, navigation was suspended through this lock from August 1 to November 13, and through No. 1, on account of repairs, from October 1 to December 1. High water and ice interfered with navigation as follows: Lock No. 1, sixty days; Lock No. 2, thirty days; Lock No. 3, twenty-five days; Lock No. 4, sixteen days; Lock No. 5, ten days. As soon as the walls of Lock No. 1 are raised, the number of days of suspension through this lock will be decreased. This work has been authorized.

Repairs to Locks Nos. 1–3 were made under the appropriation for Improving Little Kanawha River, West Virginia. Those to Lock No. 2 being practically completed, the operating and care of this lock will be a charge under the indefinite appropriation. Minor repairs were made to Lock No. 4, and all of the locks were operated.

Lock No. 5.—Repairs were made to the dam and guide cribs, 18,000 feet of timber and 1,000 pounds of iron being used. These structures are still in bad condition and should be rebuilt during the year 1909.

ALLOTMENTS.

November 28, 1891	$1,500.00	July 12, 1902	$2,705.25
July 15, 1892	4,426.65	July 20, 1903	4,318.97
July 21, 1893	3,837.97	March 7, 1904	500.00
July 16, 1894	3,491.03	July 13, 1904	1,931.79
July 20, 1895	3,378.17	July 17, 1905	1,640.57
July 24, 1896	830.72	October 26, 1905	3,700.00
July 23, 1897	1,684.03	July 19, 1906	7,848.21
August 3, 1898	3,038.53	October 12, 1906	2,000.00
July 21, 1899	2,331.58	July 18, 1907	9,636.51
July 14, 1900	2,271.61		
June 25, 1901	3,470.84	Total	64,542.43

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Summary of expenditures for operating and care of locks and dams on Little Kanawha River, West Virginia, for the fiscal year ending June 30, 1908.

Office expenses and superintendence	$1,907.89
Labor	6,820.33
Fuel	139.87
Expenses	438.16
Repairs	2,136.18
Total	11,442.43

COMMERCIAL STATISTICS.

Commerce that has passed Lock No. 5 for the ten years ending December 31, 1907.

Year.	Quantity.
	Tons.
1898	122,405
1899	138,664
1900	119,439
1901	122,190
1902	69,706
1903	73,464
1904	66,415
1905	106,510
1906	70,289
1907	99,074

Commerce passing each of the five locks and dams in Little Kanawha River, West Virginia, during the calendar year ending December 31, 1907.

Articles.		Lock No. 1.	Lock No. 2.	Lock No. 3.	Lock No. 4.	Lock No. 5.
Bricks	tons	20	20	20	22	61
Carbon black	do					1,662
Coal	do	86	198	72	86	125
Dry goods	do	207	226	230	225	255
Farm products	do	546	596	588	553	658
Furniture	do	113	136	132	148	183
Groceries and paints	do	1,262	1,252	1,199	156	1,247
Hardware	do	337	388	402	357	381
Livestock	do	12	14	10	7	7
Lumber	do	629	1,519	823	688	1,196
Oil-well supplies	do	974	1,062	1,020	1,033	1,438
Salt	do	45	106	58	62	68
Sawlogs	do	71,228	89,757	88,025	65,166	56,160
Shooks	do					324
Staves	do	200	220	275	330	575
Sundries	do	2,289	2,579	2,656	2,042	2,728
Ties (railroad)	do	26,604	41,126	18,494	18,353	32,067
Total	do	104,552	139,159	113,954	89,178	99,074
Passengers	number	1,956	1,094	932	875	9,240

Navigation was practically suspended in pools Nos. 1 and 2 from August 1 to November 30, 1907, owing to repairs to Locks and Dams Nos. 1 and 2.

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List of stern-wheel boats plying on the Little Kanawha River, West Virginia, during calendar year 1907.

Name of boat.	Length.	Breadth.	Depth.	Tonnage.
Steamboats:	*Feet.*	*Feet.*	*Feet.*	
Darling	102.0	22.3	4.0	78
Burnadina King	99.7	16.6	3.0	50
Alma	95.4	17.7	2.5	35
Loma (United States)	83.0	15.7	4.7	51
Frank Tyler	103.0	22.0	3.5	71
Carrie V	100.6	19.1	3.1	46
Gazette	69.0	15.8	1.8	19
Pioneer City	90.4	24.5	3.0	51
Boats propelled by gasoline:				
Clipper	59.2	7.0	1.6	6
Albatross	67.6	8.7	2.0	9
Reliance	65.8	8.8	2.3	12
Calhoun	67.6	7.9	1.9	8
Edith H	64.6	12.2	5.0	10
Creston	66.3	10.2	2.1	12
Hurricane	59.2	7.4	1.5	6
Mable B	78.8	7.0	1.6	8
Orion	50.0	7.5	2.0	6
H. B. Stout	92.4	8.0	2.0	14
Winona	81.0	8.0	1.8	10
Wabash	54.5	8.1	1.9	7
Leone	60.0	10.4	2.5	9
Elanora	83.0	10.7	2.0	15
Return	65.0	9.8	1.9	10
Helper	51.0	10.7	1.8	8
Rayman	59.0	12.2	2.0	13
Orena L	69.3	9.7	2.0	10
Arthur	30.0	5.0	1.4	5
International	35.0	8.0	2.0	6
Star	35.0	6.0	1.5	3
Swan	40.0	8.0	2.0	5
Harry W	54.8	8.8	1.8	7
Big Jeff				
Blanch M	41.1	9.0	3.2	7
Clarence	79.0	9.7	2.8	14
Ina	30.0	7.4	2.0	4
Ella	49.0	9.2	2.6	11
Togo	65.4	8.2	2.5	9
Eagle	64.0	10.0	1.9	11
Elvira	66.8	9.3	2.6	14
Ajax				1
Sampson				
Warda	49.0	12.0	2.6	12
June	40.0	8.0		2

The above table does not include pleasure boats.

Report of lockages at Locks Nos. 1–5, Little Kanawha River, West Virginia, for calendar year ending December 31, 1907.

	Lock No. 1.	Lock No. 2.	Lock No. 3.	Lock No. 4.	Lock No. 5.
Steamboats	605	531	473	500	1,289
Barges and flats	363	451	361	372	712
Rafts	2,316	2,849	2,544	2,435	2,585
Miscellaneous	286	192	218	150	274
Total	3,570	4,008	3,596	3,457	5,361
Number of lockages	2,669	3,739	3,343	3,294	4,738

G G 4.

IMPROVEMENT OF KANAWHA RIVER, WEST VIRGINIA.

Under the approved project for the expenditure of the balance remaining from the funds appropriated by the act of June 4, 1897, the following was accomplished: Completed guide cribs at Lock No.

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11 and installed steam-power gate-operating machinery at Lock No. 8. This completes the work approved, but additional work is required and a project will be submitted for doing such work as the funds available will permit.

The operating machinery as installed is not satisfactory, as it does not reduce the cost of operating and the amount of time saved will not offset the cost of installation. Further experiments are being made at Lock No. 8.

As the mouth of the Kanawha is particularly well adapted for an ice harbor, the piers which were built at Point Pleasant to form an ice harbor, and which have become so dilapidated as to make them practically worthless for the purpose, should be rebuilt. It is believed that the most economical construction for these piers would be concrete, the estimated cost of which is $24,000.

Request has been received from those interested in the improvement of this river for the addition of guide walls to the locks for the lower and upper entrances. Such walls would prove a benefit to the general navigation of the river.

The commercial statistics for this river are contained in the report for operating and care of locks and dams on Kanawha River.

Money statement.

July 1, 1907, balance unexpended	$50,290.20
Amount received from sale	633.43
	50,923.63
June 30, 1908, amount expended during fiscal year for works of improvement	4,339.65
July 1, 1908, balance unexpended	46,583.98
July 1, 1908, amount covered by uncompleted contracts	3,427.44

APPROPRIATIONS.

March 3, 1873	$25,000.00	February 1, 1888	$30,370.15
June 23, 1874	25,000.00	August 11, 1888	350,000.00
March 3, 1875	300,000.00	September 19, 1890	300,000.00
August 14, 1876	270,000.00	July 13, 1892	225,000.00
June 18, 1878	222,000.00	March 3, 1893	500,000.00
March 3, 1879	150,000.00	March 2, 1895	580,700.00
June 14, 1880	200,000.00	June 4, 1897	273,000.00
March 3, 1881	200,000.00		
August 2, 1882	200,000.00	Total	4,272,949.45
July 5, 1884	200,000.00	Carried to surplus fund	1,086.31
August 5, 1886	187,500.00		
February 1, 1888	84,379.30	Balance	4,271,863.14

NOTE.—Received from sales, etc., $2,890.75.

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GG 5.

OPERATING AND CARE OF LOCKS AND DAMS ON KANAWHA RIVER, WEST VIRGINIA.

The slack-water system of the Kanawha River consists of 10 locks and dams of which 2 are fixed and 8 movable, and provides 6-foot navigation over a distance of 90 miles from Point Pleasant upstream. As mentioned in previous reports, the cost of maintaining this system is increasing, owing to its length of service. This is especially true at the movable dams, the first of which (Nos. 4 and 5) were completed in 1880, and the last (Nos. 9, 10, and 11) in 1898. At the close of the year the works were practically in good condition.

It was exceptionally difficult to maintain pools during the past year. Sudden and excessive rains caused the tributaries to discharge large volumes of water. The water in the Kanawha would therefore rise rapidly, making it necessary to lower the weirs without delay, and would pass out with equal rapidity causing the pools to drop below the crest of the dams before the weirs could be raised again. Perhaps the quickest rise known occurred on September 24. The river rose 1 foot in five minutes for twenty minutes.

Navigation was suspended as follows: Six days by ice and eleven days by high water. There was no extreme high water during the year, the highest stage reached at Charleston being 31 feet.

The movable dams were operated as follows:

	Raised.	Lowered.
Number.	*Times.*	*Times.*
4	7	7
5	6	6
6	8	7
7	6	6
8	9	8
9	8	8
10	10	10
11	9	8

New lock houses for Locks Nos. 4–11, a contract for which had been entered into, were practically completed. These are brick structures of six rooms. One house was built at each lock.

Steel horses for Dams Nos. 4 and 5 were received from the contractor in November. Six horses were placed in each dam, but high water prevented placing the remainder.

Four service boats were built under contract. These boats replaced similar ones which had become worthless.

The following is a summary of the additional work accomplished:

Lock No. —Repaired bank protection on abutment side and below lock, painted roofs of buildings, and papered 12 rooms of lock houses.

Lock No. 3.—Drained swamp back of lock yard, and painted shop, office, and outbuildings.

Lock No. 4.—Laid 256 feet of sewer pipe, painted interior and exterior of buildings, papered rooms of lock houses, and repaired buildings.

Lock No. 5.—Renewed wooden part of top of weir, made and placed a new set of wickets, repaired pier, fenced the additional land pur-

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chased, laid 110 feet of sewer pipe, and painted tin roofs of lock houses.

Lock No. 6.—Built 62 (one set) pass wickets and placed 28 of them, laid 447 feet of sewer pipe, and painted tin roofs of buildings.

Lock No. 7.—Repaired bank protection below lock, built 1 cistern, and laid 316 feet of sewer.

Lock No. 8.—Built a set of weir wickets and placed 48 of them, built 25 feet of concrete walk and 1 cistern, laid 326 feet of sewer pipe, repaired lock gates, and painted shops, outbuildings, and 1 lock house.

Lock No. 9.—Laid 220 feet of sewer pipe, repaired dam by placing 6 cushion blocks and 5 horses and 1 prop on weir, repaired lock gates, and painted lock houses and outbuildings.

Lock No. 10.—Laid 176 feet of sewer pipe and 27 feet of brick drain, painted office and 1 lock house and interior of 3 lock houses, and papered part of 1 lock house.

Lock No. 11.—Repaired dam by replacing 15 weir aprons with foot plank and safety bars, graded grounds around new lock house, laid 274 feet of sewer pipe, and painted tin roofs of lock houses and outbuildings.

Informal contracts were entered into for timber, lumber, irons, cement, and chains. Final delivery was made in each case.

United States telephone line.—An expert lineman was employed in carefully going over the entire system. A number of poles were reset.

U. S. dredge *Addison* removed 33,727 cubic yards of material, 35 stones, and 15 snags from the river. The machinery was overhauled and worthless parts renewed, new steel dipper, boom, and spuds purchased, and the side planking of hull renewed from water line.

U. S. towboat *James Rumsey* was employed as tender to the dredge, and in transporting materials, etc., for repairs. The towboat also removed a number of snags from the river. Needed repairs were made.

U. S. launch *Mascot* was used in making inspections of work and in transporting employees and material used in making repairs. The hull of this boat is in very bad condition.

ALLOTMENTS.

For fiscal year 1885	$7,075.00	July 13, 1900	$49,444.47
For fiscal year 1886	8,710.00	July 3, 1901	47,506.31
July 8, 1886	11,170.00	May 16, 1902	2,500.00
June 17, 1887	13,289.00	June 23, 1902	9,500.00
February 4, 1888	3,549.70	July 17, 1902	52,859.86
August 16, 1888	19,990.02	July 14, 1903	61,946.86
July 11, 1889	19,261.61	July 15, 1904	60,770.71
July 16, 1890	25,702.27	July 17, 1905	53,740.86
October 9, 1890	3,400.00	July 20, 1906	103,726.10
July 14, 1891	19,453.00	July 18, 1907	70,314.25
July 6, 1892	21,891.64	May 2, 1908	5,467.92
July 12, 1893	24,549.41		
July 10, 1894	30,600.00	Total	907,200.38
July 2, 1895	30,200.00	Withdrawn:	
July 25, 1896	37,082.59	Fiscal year 1888 $2,049.70	
August 2, 1897	22,700.77	Fiscal year 1890 .01	
July 26, 1898	36,331.90		2,049.71
September 29, 1898	2,650.00		
June 2, 1899	14,000.00	Balance	905,150.67
August 2, 1899	36,416.13		
April 10, 1900	1,400.00		

NOTE.—Received for damaged skiff, $19.

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Summary of expenditures for operating and care of locks and dams on Kanawha River, West Virginia, for the fiscal year ending June 30, 1908.

Office expenses and superintendence	$8,896.77
Labor	51,589.49
Fuel	849.85
Expenses	593.42
Repairs	34,894.07
Total	96,823.60

CONTRACT IN FORCE.

LOCK HOUSES, ETC.

Contractor: Volney E. Taylor.

Rate: Lock House, with outbuildings, at Lock No. 4, at $3,570; lock house, with outbuildings, at Lock No. 5, $3,390; lock house, with outbuildings, at Lock No. 6, $3,360; lock house, with outbuildings, at Lock No. 7, $3,360; lock house, with outbuildings, at Lock No. 8, $3,500; lock house, with outbuildings, at Lock No. 9, $3,520; lock house, with outbuildings, at Lock No. 10, $3,450; lock house, with outbuildings, at Lock No. 11, $3,520; for masonry over that shown in plan, $8.35 per cubic yard.

Date of approval: June 4, 1907.

Date of beginning: July 5, 1907.

Date of expiration: 300 fair working days.

COMMERCIAL STATISTICS.

Statement of number of tons of coal, including that manufactured into coke, shipped by river from mines on the Kanawha below Kanawha Falls, for the ten years ending December 31, 1907.

Year.	Quantity.	Year.	Quantity.
	Tons.		Tons.
1898	1,089,160	1903	1,333,220
1899	942,800	1904	1,094,700
1900	1,240,680	1905	1,460,680
1901	1,370,180	1906	1,176,300
1902	987,880	1907	1,667,900

Tonnage of the Kanawha River for the calendar year ending December 31, 1907.

Articles.		Quantity.	Tonnage.
Coal	bushels	41,697,000	1,667,880
Timber	feet B. M.	18,260,000	31,955
Staves, oak	number	49,000	294
Hoop poles	do	687,000	1,342
Laths	do	1,306,000	261
Railroad ties, oak	do	334,535	25,653
Shingles	do	187,000	28
Bricks	do	445,000	1,113
Salt	barrels	5,202	728
Merchandise and produce	tons		60,000
Total			1,798,013

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Total tonnage of the Kanawha River for the ten years ending December 31, 1907.

Year.	Quantity.	Year.	Quantity.
	Tons.		*Tons.*
1898	1,244,384	1903	1,506,043
1899	1,124,364	1904	1,283,153
1900	1,475,980	1905	1,613,889
1901	1,547,610	1906	1,327,708
1902	1,090,797	1907	1,799,013

Commerce passing each of the 10 locks and dams in Kanawha River, West Virginia, during the calendar year ending December 31, 1907.

Articles.	Lock No. 2.	Lock No. 3.	Lock No. 4.	Lock No. 5.	Lock No. 6.
Coal ..... bushels..	1,344,000	7,831,000	17,278,500	22,781,000	26,637,000
Lumber, etc ..... feet..	396,800	488,840	617,896	564,700	1,460,645
Shingles ..... number..	34,000	34,000	140,750	131,000	47,000
Laths ..... do....	23,200	22,000	26,300	18,600	354,200
Bricks ..... do....	7,700	15,100	32,500	45,600	129,600
Miscellaneous freight ..... tons..	4,922	6,032	8,862	11,161	29,519
Salt ..... barrels..	107	202	386	579	1,432
Hoop poles ..... number..	.....	.....	.....	15,000	162,160
Railroad ties ..... do....	.....	.....	.....	.....	32,700
Steamboats ..... do....	1,206	1,597	2,048	1,999	2,318
Coal barges ..... do....	212	1,134	2,653	3,361	3,859
Other craft ..... do....	91	116	168	200	220
Lockages ..... do....	1,321	1,923	1,198	1,041	1,435
Dams up ..... days..	.....	.....	154	123	151
Passengers ..... number..	5,632	5,849	8,780	9,812	24,002

Articles.	Lock No. 7.	Lock No. 8.	Lock No. 9.	Lock No. 10.	Lock No. 11.
Coal ..... bushels..	28,951,000	35,944,800	40,246,650	40,239,800	41,215,700
Lumber, etc ..... feet..	3,652,525	4,612,898	4,780,440	4,979,900	6,193,025
Shingles ..... number..	46,700	21,000	3,000	.....	7,000
Laths ..... do....	734,900	1,132,700	1,183,700	1,293,200	933,000
Bricks ..... do....	396,200	267,400	357,285	334,855	304,655
Miscellaneous freight ..... tons..	25,978	28,029	30,545	29,492	29,911
Salt ..... barrels..	2,231	2,418	3,929	3,717	3,423
Hoop poles ..... number..	78,000	205,860	298,860	513,000	537,000
Railroad ties ..... do....	58,950	206,280	247,821	257,113	334,525
Staves ..... do....	4,000	24,000	22,000	35,000	49,000
Steamboats ..... do....	2,352	2,763	2,501	2,552	2,697
Coal barges ..... do....	4,499	5,551	6,520	6,452	6,424
Other craft ..... do....	438	227	333	253	319
Lockages ..... do....	1,179	1,247	967	1,041	841
Dams up ..... days..	151	131	121	108	78
Passengers ..... number..	21,068	19,944	16,089	16,796	19,567

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List of steamboats plying Kanawha River, West Virginia, for the calendar year 1907.

[All stern-wheel, except as noted.]

Name of boat.	Character.	Length.	Breadth.	Depth.	Tonnage.
		Feet.	*Feet.*	*Feet.*	
Greenland [a]	Packet	204.4	31.9	5.4	[illegible]
Tacoma	do	182.3	32.4	5.0	278
Kanawha	do	180.6	35.2	5.2	[illegible]
Henry M. Stanley	do	180.0	32.4	5.5	[illegible]
Greenwood	do	168.5	30.0	4.4	[illegible]
Columbia	do	156.0	24.2	4.0	[illegible]
J. Q. Dickinson	do	135.5	24.5	5.1	[illegible]
Cricket	do	132.6	18.3	2.9	[illegible]
Argand	do	132.6	24.0	5.0	[illegible]
Calvert	do	122.0	20.2	4.0	[illegible]
Baxter	do	121.0	22.4	3.6	[illegible]
Gondola	do	120.2	23.0	3.2	[illegible]
Evergreen	do	119.5	22.5	3.5	[illegible]
Neva	do	117.0	21.6	3.4	[illegible]
Frank Tyler	do	108.0	22.0	3.5	[illegible]
Genevieve	do	59.9	11.9	2.6	[illegible]
Cuba	do	50.0	9.6	2.5	[illegible]
Florence Marmet	Towboat	155.0	30.8	5.0	[illegible]
A. M. Scott [b]	do	150.9	26.0	5.8	[illegible]
Robert P. Gillham	do	149.5	31.5	4.3	[illegible]
J. T. Hatfield	do	144.5	28.8	5.6	[illegible]
J. B. Lewis	do	141.4	26.0	4.4	[illegible]
Catherine Davis	do	135.6	28.5	4.0	[illegible]
Lucie Marmet	do	134.8	28.7	4.8	[illegible]
Val P. Collins	do	132.6	24.6	4.8	[illegible]
Crown Hill	do	132.4	26.0	4.6	[illegible]
D. T. Lane	do	129.0	24.0	4.0	[illegible]
Otto Marmet	do	128.6	25.7	4.5	[illegible]
Douglas Hall	do	127.5	27.2	4.3	[illegible]
Vernie Mac	do	127.0	24.7	4.9	[illegible]
Mountain State	do	122.0	29.6	5.0	[illegible]
Conquest	do	121.0	23.5	3.9	[illegible]
J. M. Bowell	do	120.6	22.9	4.3	[illegible]
Winifrede	do	119.4	24.9	4.6	[illegible]
W. B. Calderwood	do	112.0	24.5	4.6	[illegible]
Sallie Marmet	do	109.3	20.6	4.0	[illegible]
French	do	104.8	19.9	4.0	[illegible]
Scout	do	101.1	20.6	3.5	[illegible]
Antoinette	do	100.7	19.9	3.9	[illegible]
Mary Stewart	do	100.0	24.3	3.4	[illegible]
Katie Mc	do	98.1	18.0	2.8	[illegible]
M. L. Thornton	do	73.6	14.0	2.6	[illegible]
Togo	do	65.4	8.2	2.5	[illegible]
Mountain Queen	do	54.8	15.0	2.5	[illegible]
Arlona May	do	40.5	9.0	2.0	[illegible]
J. P. Lightner	do	40.0	12.6	3.0	[illegible]
James Rumsey [b]	U. S. towboat	120.0	23.0	4.3	[illegible]
Golden Rod	U. S. light-house tender	150.0	26.5	3.7	[illegible]
Mascot [b]	U. S. launch	61.0	8.1	3.7	[illegible]
Billy Martin [b]	Pump and harbor	89.0	14.3	4.0	[illegible]
Iron Duke [b]	do	88.0	13.5	3.7	[illegible]
BOATS PROPELLED BY GASOLINE.					
Shamrock	Towboat	59.3	13.3	2.7	[illegible]
Borealis	do	47.0	9.0	1.4	[illegible]
Kid	do	75.4	15.4	2.0	[illegible]
Pearl	Launch	62.3	11.3	2.0	[illegible]
Friend	do	51.5	12.0	2.3	[illegible]
Pirate	do	44.6	10.0	2.0	[illegible]
Elvira	do	66.8	9.3	2.6	[illegible]
Carbon Black	Packet	79.0	7.6	1.7	[illegible]

[a] Side-wheel. [b] Screw propeller.

The above table does not include pleasure boats.

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APPENDIX H H.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SECOND CINCINNATI, OHIO, DISTRICT.

REPORT OF LIEUT. COL. J. G. WARREN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Muskingum River, Ohio.
2. Operating and care of locks and dams on Muskingum River, Ohio.
3. Big Sandy River and Levisa and Tug forks, West Virginia and Kentucky.
4. Operating and care of locks and dams on Big Sandy River, West Virginia and Kentucky.
5. Kentucky River, Kentucky.
6. Operating and care of locks and dams on Kentucky River, Kentucky.

ENGINEER OFFICE, UNITED STATES ARMY,
Cincinnati, Ohio, July 18, 1908.

SIR: I have the honor to submit herewith the annual reports of the works under my charge for the year ending June 30, 1908.

J. G. WARREN,
Lieut. Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

H H 1.

IMPOVEMENT OF MUSKINGUM RIVER, OHIO.

The natural condition of this work and projects for its improvement are described, and references for more extended information are given in the current summary.

OPERATIONS DURING THE FISCAL YEAR.

Lock and Dam No. 10.—The work under contract with Mr. C. O. Waxler, of Philo, Ohio, dated March 28, 1907, for constructing a lock master's dwelling and storehouse combined at this lock was completed December 14, 1907, at a cost of $4,719.

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Lock and Dam No. 11.—The work under contract with Mr. E. J. Landor, of Canton, Ohio, dated April 4, 1907, for constructing the lock, dam, and accessories, was in progress throughout the year, and on June 30, 1908, the permanent buildings, comprising one office, two dwellings, and two outbuildings, had been completed, two cisterns built, and one well driven. The cofferdam inclosing the lock pit was completed early in the year, and about one-half of the shoring required for river bank placed; about 50 per cent of the excavation in the lock pit finished, and upward of 60 per cent of the round piling in lock foundation driven. A row of sheet piling was driven along upstream edge of the upper wing wall across upper edge of the lock floor and along the outer line of the river wall to a point about 40 feet below the proposed apron of dam. The upper wing wall was completed, and 57 feet in length of concrete floor of lock laid.

The following is a statement of the work done during the year:

Classification.	Quantities.	Rate.	Amount.
Earth excavation ..... cubic yards..	9,606.50	$0.60	$5,763.90
Embankment ..... do....	7.50	.50	3.75
Concrete ..... do....	702.45	7.00	4,917.15
Iron and steel ..... pounds..	4,332.00	.075	324.90
Timber ..... feet B. M..	27,325.00	40.00	1,093.00
Piling ..... linear feet..	19,314.00	.35	6,759.90
Dwellings ..... number..	2	3,250.00	6,500.00
Outbuildings ..... do....	2	250.00	500.00
Office ..... do....	1	400.00	400.00
Cisterns ..... do....	2	180.00	360.00
Skilled labor ..... hours..	6.00	.30	1.80
Unskilled labor ..... do....	9.50	.20	1.90
Total			26,536.30

Commercial statistics are reported under the head of "Operating and care," etc.

Money statement.

July 1, 1907, balance unexpended	$160,179.47
Received from sale of public property	303.61
	160,483.08
June 30, 1908, amount expended during fiscal year for works of improvement	24,354.54
July 1, 1908, balance unexpended	136,128.54
July 1, 1908, outstanding liabilities	270.50
July 1, 1908, balance available	135,858.04
July 1, 1908, amount covered by uncompleted contracts	119,108.31

APPROPRIATIONS.

August 11, 1888	$102,000.00
July 1, 1898	6,000.00
June 13, 1902	10,300.00
March 3, 1905	118,000.00
March 2, 1907	48,000.00
	284,300.00
Received from other sources	562.23
Total	284,862.23

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CONTRACTS IN FORCE.

CONTRACT FOR BUILDING LOCK AND DAM NO. 11, AND ACCESSORIES, MUSKINGUM RIVER, OHIO.

Name of contractor: Edward J. Landor.
Date of approval: April 16, 1907.
Date of beginning: April 26, 1907.
Date of expiration: December 31, 1908.

Item.		Contract price (unit rate).
Earth excavation	cubic yard	$0.60
Rock excavation	do	2.00
Embankment	do	.50
Concrete	do	7.00
Iron and steel	pound	.07½
Riprap, placed	cubic yard	1.00
Riprap, furnished and placed	do	1.50
Timber	M feet B. M.	40.00
Piling	linear foot	.35
Dwellings	each	3,250.00
Outbuildings	do	250.00
Office building		400.00
Cisterns	each	130.00

CONTRACT (EMERGENCY) FOR BUILDING LOCK-MASTER'S DWELLING AND STOREHOUSE COMBINED, AT LOCK NO. 10.

Name of contractor: C. O. Waxler.
Date of approval: (Emergency contract.)
Date of beginning: April 7, 1907.
Date of expiration: On or before October 31, 1907.

Item.	Contract price.
For the construction of 1 lock-master's dwelling and storehouse combined, at Lock No. 10, Muskingum River, Ohio	$4,719.00

Completed.

H H 2.

OPERATING AND CARE OF LOCKS AND DAMS ON MUSKINGUM RIVER, OHIO.

Under an allotment from the indefinite appropriation for operating and care of canals and other works of navigation there has been expended during the year $82,696.68.

The system comprises 10 locks and fixed dams and 4 short lateral canals aggregating 2½ miles in length. The canal at Dam No. 9, 1 mile in length, although not now needed for navigation, is maintained to furnish water power and to supply water needed for docking purposes in the old lock at its lower end.

Navigation was suspended on account of ice in the canals from January 28 to February 19, 1908, a period of thirteen days, and on account of high water in February and March, 1908, for a period of seventeen days.

Lock No. 1.—Prepared timbers for use in renewing unserviceable parts of the upper lock gates. Overhauled and repaired turbines used

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for operating the lower lock gates. Renewed the fender planking and repaired two timber blocks on middle lock gates. Labor was frequently employed to assist in removing detachable irons from lock walls on account of high water, and to assist in removing sedimentary deposits, ice, and drift from the lock.

Lock No. 2.—Purchased timber for repair of dam; this work, however, was not undertaken during the year on account of continued high stages of the river. Labor was employed to assist in clearing the deposits from around the lock gates. About 80 per cent of the interior and exterior woodwork of lockmaster's dwelling was repainted. Renewed the protection timbers for mooring lines on land wall of lock.

Lock No. 3.—Under date of February 13, 1908, a contract was entered into with S. W. Hoffman, of Zanesville, Ohio, for constructing a concrete revetment 100 feet in length on river bank back of lockmaster's dwelling. The work was completed June 16, 1908. The following is a statement of the work done under this contract:

Classification.	Quantity.	Rate.	Amount.
Excavation.....cubic yards..	75	$0.50	$37.50
Filling.....do....	435	.50	217.50
Concrete.....do....	90	9.85	886.50
Total.....	.....	.....	1,141.50

Refilled and graded the eroded bank of river at left end of dam with 615 cubic yards of earth. Refastened shaft to balanced discharge valve in river wall of lock. Repainted part of the interior of lock master's dwelling and made minor repairs to the canal embankment between lock house and road. Four thousand seven hundred and forty feet of canal banks were mowed and cared for.

Lock No. 4.—Under date of December 26, 1906, a contract was entered into with Clifton Brothers, of Zanesville, Ohio, for reconstructing in concrete the conduit leading from the canal above the lock to the mill race below, and guide and guard cribs below the lock; this work was completed September 24, 1907. The following is a statement of the work done under this contract during the year:

Conduit.

Classification.	Quantities.	Rate.	Amount.
Excavation.....cubic yards..	1,550	$0.50	$775.00
Filling.....do.....	1,787	.40	714.80
Lumber.....feet B. M..	1,000	50.00	50.00
Concrete.....cubic yards..	371	6.80	2,522.80
Total.....	.....	.....	4,062.60

Guide and guard walls.

Classification.	Quantities.	Rate.	Amount.
Excavation.....cubic yards..	139	$0.50	$69.50
Filling.....do.....	220	.40	88.00
Concrete.....do.....	260	6.50	1,690.00
Total.....	.....	.....	1,847.50

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Two steel head gates with operating apparatus for controlling the flow of water through the conduit were placed in position, the cost of which is given in the following statement:

Metal work, 6,560 pounds, at $0.058	$380.48
Timber	34.50
Labor	34.82
Total	449.80

Under contract with Clifton Brothers, of Zanesville, Ohio, dated September 19, 1907, the guide and guard cribs above the lock and steps between cribs and lock walls leading to the needle-dam trestles at head of lock were rebuilt in concrete; this work was completed June 15, 1908. The items of work done under this contract are given in the following statement:

Classification.	Quantities.	Rate.	Amount.
Excavation ..... cubic yards..	84	$0.35	$29.40
Concrete ..... do....	127.25	4.25	540.81
Filling ..... do....	68	.45	30.60
Cement ..... barrels..	112	1.95	218.40
Total	.....	.....	819.21

Under contract dated February 11, 1908, with S. W. Hoffman, of Zanesville, Ohio, a storehouse and waiting room combined was reconstructed in concrete. The amount expended under this contract was $498.

Two reenforced concrete beams were placed under foundation wall of lock master's dwelling with a view to forestalling further settlement of walls, caused by excavations made by reconstructing conduit. Constructed concrete steps to the front porch of lock master's dwelling. Renewed the railing of front porch, and constructed a concrete walk from house to street. The mill race was cleared of mud deposits and débris, and canal banks mowed and cared for.

Lock No. 5.—Reconstructed in concrete a washout of the embankment, 14 feet in length, running from head of lock to high ground. Refilled with earth a washout in the terre-plein of lock below this embankment. Replaced with concrete 18 feet of masonry damaged by ice and drift in head of river wall of lock. Repainted the interior and exterior of lock master's dwelling. Material purchased for making necessary repairs to the dam. This work, however, was not undertaken during the year on account of continued high stages of the river.

Lock No. 6.—The work under contract with Clifton Brothers, of Zanesville, Ohio, dated April 8, 1907, for reconstructing in concrete two guard cribs above lock, aggregating 28 feet in length, was completed October 31, 1907. The items of work done under this contract are given in the following statement:

Classification.	Quantities.	Rate.	Amount.
Excavation ..... cubic yards..	98	$0.60	$58.80
Concrete ..... do....	105.73	7.00	740.11
Piling ..... linear feet..	216	.60	129.60
Total	.....	.....	928.51

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The work under contract with Clifton Brothers, of Zanesville, Ohio, dated September 19, 1907, for reconstructing in concrete the guide crib below the land wall of lock, 190 feet in length, was completed June 23, 1908. The items of work done under this contract are given in the following statement:

Classification.	Quantities.	Rate.	Amount.
Excavation.....cubic yards..	996	$0.35	$348.60
Concrete.....do....	960.56	4.00	3,842.24
Filling.....do....	200	.45	90.00
Cement.....barrels..	832.50	1.95	1,623.38
Total.....			5,904.22

Parts of the machinery for operating the upper lock gates were renewed, and the balanced discharge valve in river wall of lock refastened to its shaft with steel pins.

Lock No. 7.—Replaced the table of wood planer in workshop. The flood-damaged doors and windows of this shop were repaired, and its turbine and machinery overhauled, repaired, and adjusted. Repainted the storehouse, workshop, oil house, tool house, and metal bridge over canal. Renewed the wooden floor of this bridge and repaired part of the sheathing on upper lock gates. All the timber and lumber used in repair work throughout the system was planed and prepared in the workshop located at this lock.

Lock No. 8.—Twenty feet in length of the stone coping of a retaining wall above the right abutment of dam was replaced with concrete. Renewed 12 guard piles above river wall of lock. Extended the wooden guide crib below the river wall of lock 25 feet. Refastened the balanced discharge valve in river wall of lock to its shaft with steel pins. Refastened the stem to the cylindrical filling valve in river wall of lock. Repaired the operating machinery of cylindrical valve in land wall of lock.

Lock No. 9.—The work under contract with Clifton Brothers, of Zanesville, Ohio, dated April 8, 1907, for reconstructing in concrete the revetment of canal embankment, 215 feet in length, and the guard crib above lock, 43 feet in length, was completed October 30, 1907. The items of work done under this contract are given in the following statement:

Revetment.

Classification.	Quantities.	Rate.	Amount.
Excavation.....cubic yards..	203.78	$0.90	$183.40
Filling.....do....	660	.60	396.00
Concrete.....do....	270	7.70	2,079.00
Total.....			2,658.40

Guard crib.

Classification.	Quantities.	Rate.	Amount.
Excavation.....cubic yards..	186.22	$0.90	$167.60
Concrete.....do....	139	7.70	1,070.30
Total.....			1,237.90

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With a view to making permanent repairs to the canal embankment for the purpose of furnishing the water power with which the United States is charged, 7,587 cubic yards of earth was refilled over 1,090 feet of eroded and damaged embankment above the river wall of old Lock No. 9, and embankment running from land wall of lock to high ground. The new upper and lower gates for old Lock No. 9 were assembled and the upper gates placed in position. Renewed the frames of screens for filling valve culverts.

Lock No. 10.—The work under contract with Clifton Brothers, of Zanesville, Ohio, dated September 19, 1907, for reconstructing in concrete the guide and guard cribs above the lock, each 24 feet in length, and the guide crib below the land wall of lock, 90 feet in length, was completed June 16, 1908. The items of work done under this contract are given in the following statement:

Guide and guard cribs above lock.

Classification.	Quantities.	Rate.	Amount.
Excavation.....cubic yards..	161.00	$0.35	$56.35
Concrete.....do....	123.50	3.80	469.30
Filling.....do....	85.55	.25	21.39
Cement.....barrels..	131.75	1.95	256.91
Total.....			803.95

Guide cribs below lock.

Classification.	Quantities.	Rate.	Amount.
Excavation.....cubic yards..	247.00	$0.35	$86.45
Concrete.....do....	350.32	3.80	1,331.22
Filling.....do....	94.10	.25	23.52
Cement.....barrels..	339.00	1.95	661.05
Total.....			2,102.24

The work under contract with Clifton Brothers, of Zanesville, Ohio, dated April 8, 1907, for reconstructing in concrete the revetment of canal embankment, 257.33 feet in length above the land wall of lock, was completed October 30, 1907. The items of work done under this contract are given in the following statement:

Classification.	Quantities.	Rate.	Amount.
Excavation.....cubic yards..	166.00	$0.60	$99.60
Concrete.....do....	181.07	8.00	1,448.56
Filling.....do....	290.40	.60	174.24
Total.....			1,722.40

Extra labor was employed to assist the lock force in clearing sedimentary deposits from around the lock gates and guard gates at head of canal, to repair the winches for operating gates, hand rails on gates and side porch on lock master's dwelling, and in mowing and cleaning the canal embankments.

U. S. dredge Malta.—This dredge was usefully employed throughout the working season in dredging out canals, approaches to locks,

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and shoals in the pools. The total number of cubic yards excavated was 78,947, at an average cost of $0.09647 per cubic yard. Minor repairs were made to the hull, and machinery was overhauled, repaired, and adjusted; many of the worn-out and unserviceable fixtures of the dredge were replaced with new ones.

The U. S. steamer *Vega* was employed during the working season as dredge tender, towing and transporting material and supplies required for repair work accomplished by hired labor, assisting in the repair work, and making inspection trips. On November 30, 1907, the steamboat was delivered to the Parkersburg Dock Company at Parkersburg, W. Va., for docking and replacing decayed timber of the hull under contract dated November 26, 1907; the work was completed December 10, 1907; it included the replacement of 1,137 feet B. M. oak side planking, the metal sheathing of hull, and the recalking of the entire hull. The cost of the work done under this contract was $625.09. During the year minor repairs were made to her hull, and her machinery was overhauled, repaired, and adjusted, the upper works repainted, and unserviceable parts of steam fittings and equipment replaced.

The U. S. steamer *Merrill*, built under contract with the Howard Ship Yards Company, of Jeffersonville, Ind., dated June 15, 1907, was completed and delivered at Marietta, Ohio, on December 17, 1907, at a cost of $14,400. The boat was placed in commission on June 20, 1908, and served as dredge tender to the close of the fiscal year.

The floating pile driver and derrick boat was employed in connection with the repair of guide crib at Lock No. 8 and repair of the dredging fleet. A new boiler was purchased and installed, and minor repairs were made to the hull and cab.

Establishmnt of harbor lines at Zanesville, Ohio.—The two lines below Dam No. 10, as tentatively determined at public hearings, aggregating 16,550 feet in length, have been laid out on the ground, together with all reference points practicable. Maps were completed showing the four lines surveyed.

Summary of expenditures for operating and care of locks and dams on Muskingum River, Ohio, for the fiscal year ending June 30, 1908.

Services	$31,147.28
Supplies	1,630.05
Materials	31,747.43
New plant	16,279.00
Fuel	1,214.28
Miscellaneous	678.64
Total	82,696.68

ALLOTMENTS.

Appropriated August 5, 1886	$20,000.00
Allotted—	
July 21, 1887	190,000.00
August 13, 1888	177,638.00
July 1, 1889	232,080.00
July 19, 1890	195,665.00
May 28, 1891	20,000.00
July 8, 1891	155,200.00

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Allotted—	
November 9, 1891	$39,980.00
November 24, 1891	1,200.00
December 9, 1891	1,200.00
January 5, 1892	12,241.54
August 3, 1892	42,919.47
July 22, 1893	52,745.36
July 25, 1894	47,157.66
July 12, 1895	29,971.20
July 24, 1896	41,337.10
July 23, 1897	43,527.50
July 23, 1898	35,950.58
July 25, 1899	44,954.30
October 16, 1899	1,500.00
July 14, 1900	44,921.96
June 25, 1901	88,251.42
July 25, 1902	47,576.72
July 10, 1903	50,358.37
July 11, 1904	54,000.75
July 21, 1905	47,914.68
July 21, 1905, received from city of Zanesville, Ohio, for dredging	210.00
September 28, 1905	4,200.00
May 28, 1906	24,000.00
July 28, 1906	60,385.91
March 30, 1907, by sale of blueprints	1.50
July 19, 1907	59,116.02
February 13, 1908	7,000.00
Received from other sources	107.43
Total	1,823,277.47

SPECIAL WORK AUTHORIZED BY ACT OF CONGRESS.

Allotted—	
March 21, 1895, protection wall at Zanesville	$1,651.00
June 17, 1895, pier of railroad bridge at Marietta	10,449.60
June 17, 1895, pier of county bridge at Taylorsville	5,834.20
Total	17,934.80

CONTRACTS IN FORCE.

CONTRACT FOR RECONSTRUCTING, IN CONCRETE, CONDUIT, GUIDE, AND GUARD CRIBS AT LOCK NO. 4, MUSKINGUM RIVER, OHIO.

Name of contractor: Clifton Brothers.
Date of approval: January 14, 1907.
Date of beginning and date of expiration: Within ten days after date of notification of approval of contract, and be completed on or before June 30, 1907.

Items.		Contract price (unit rate).
Conduit.		
Excavation	cubic yard	$0.50
Filling	do	.40
Lumber	M feet B. M.	50.00
Concrete	cubic yard	6.80
Cribs.		
Excavation	cubic yard	.50
Filling	do	.40
Lumber	M feet B. M.	40.00
Concrete	cubic yard	5.50

Completed.

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CONTRACT FOR RECONSTRUCTING, IN CONCRETE, THE REVETMENT OF CANAL EMBANKMENTS AT LOCKS NOS. 9 AND 10, AND GUARD CRIBS AT LOCKS NOS. 6 AND 9.

Name of contractor: Clifton Brothers.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: Within ten days after date of signature of contract, and be completed on or before October 31, 1907.

Items.		Contract price (unit rate).
Work at Lock No. 6.		
Excavation	cubic yard	$2.60
Concrete	do	7.00
Piling	linear foot	.60
Work at Lock No. 9.		
Excavation	cubic yard	.90
Concrete	do	7.70
Filling	do	.60
Work at Lock No. 10.		
Excavation	cubic yard	.60
Concrete	do	8.00
Filling	do	.60

Completed.

CONTRACT FOR CONSTRUCTING WOODEN-HULL TOWBOAT.

Name of contractor: Howard Shipyards Company.
Date of approval: June 26, 1907.
Date of beginning and date of expiration: At the date of notification of approval of contract, and delivery to be made within one hundred days thereafter.

Item.	Contract price.
For one wooden-hull towboat	$14,400

Completed.

Name of contractor: S. W. Hoffman.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: Within ten days after date of notification of approval of contract, and be completed on or before June 30, 1908.

Item.	Contract price.
For reconstructing a storehouse and waiting room at Lock No. 4	$400

Completed.

Name of contractor: S. W. Hoffman.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: Within ten days after date of notification of approval of contract, and be completed on or before June 30, 1908.

Items.		Contract price (unit rate).
Excavation	cubic yard	$2.50
Filling	do	.50
Concrete	do	9.25

Completed.

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Name of contractor: Clifton Brothers.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: Within ten days after date of notification of approval of contract, and be completed on or before June 30, 1908.

Items.		Contract price (unit rate).
Work at Lock No. 4.		
Excavation	cubic yard	$0.85
Concrete	do	4.25
Filling	do	.45
Cement	barrel	1.95
Work at Lock No. 6.		
Excavation	cubic yard	.85
Concrete	do	4.00
Filling	do	.45
Cement	barrel	1.95
Work at Lock No. 10.		
Excavation	cubic yard	.85
Concrete	do	3.80
Filling	do	.45
Cement	barrel	1.95

Completed.

Name of contractor: Parkersburg Dock Company.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: Within two days after delivery of boat to company's dock, and be completed within fifteen days thereafter.

REPAIRS TO U. S. STEAMER VEGA.

Items.		Contract price (unit rate).
Placing boat on docks, holding on during repairs, and letting in water after completion of repairs		[a] $35.00
Oak plank	M. ft. B. M.	56.00
Galvanized iron	pound	.09
Bolts, spikes, nails	do	.05
Calking cotton	do	.15
Oakum	do	.10
White lead	do	.08
Linseed oil	gallon	.55
Services:		
Superintendent	day	4.25
Foreman	do	3.25
Calkers	do	3.00
Carpenters	do	3.00
Blacksmith and helper	do	5.50
Painter	do	3.00
Laborers	do	2.00

[a] Lump sum.

Completed.

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COMMERCIAL STATISTICS.

Commerce of Muskingum River during the calendar year ending December 31, 1907.

LOCK NO. 1.

Month.	Steamboats.	Barges.	Miscellaneous.	Rafts.	Total.	Number of lockages.
January	3	2	.....	.....	5	5
February	5	4	.....	.....	9	9
March	24	10	33	.....	67	[illegible]
April	90	7	21	17	135	[illegible]
May	67	6	9	4	86	[illegible]
June	116	57	10	1	184	[illegible]
July	121	69	19	1	210	[illegible]
August	137	131	40	1	308	[illegible]
September	102	83	76	.....	261	[illegible]
October	118	86	21	.....	220	[illegible]
November	111	87	7	2	207	[illegible]
December	105	116	1	1	223	[illegible]
Total	994	658	237	27	1,915	1,189

LOCK NO. 2.

January	13	.....	1	.....	14	[illegible]
February	1	2	.....	.....	3	[illegible]
March	23	.....	2	2	27	[illegible]
April	62	2	6	.....	70	[illegible]
May	64	.....	7	1	72	[illegible]
June	67	1	17	2	87	[illegible]
July	70	2	26	1	99	[illegible]
August	75	2	48	1	126	[illegible]
September	49	3	22	.....	74	[illegible]
October	54	6	18	.....	78	[illegible]
November	61	5	7	2	75	[illegible]
December	62	1	.....	.....	63	[illegible]
Total	601	24	154	9	788	[illegible]

LOCK NO. 3.

January	13	.....	1	.....	14	[illegible]
February	2	.....	.....	.....	2	[illegible]
March	27	.....	.....	.....	27	[illegible]
April	62	2	2	.....	66	[illegible]
May	61	.....	2	.....	63	[illegible]
June	72	1	15	1	89	[illegible]
July	64	2	11	1	78	[illegible]
August	73	4	40	1	118	[illegible]
September	52	4	10	1	67	[illegible]
October	60	6	17	.....	83	[illegible]
November	61	6	2	2	71	[illegible]
December	60	3	1	.....	64	[illegible]
Total	607	28	101	6	742	[illegible]

LOCK NO. 4.

January	13	.....	3	.....	16	[illegible]
February	1	.....	2	.....	3	[illegible]
March	24	6	10	.....	40	[illegible]
April	62	8	2	.....	72	[illegible]
May	68	35	15	.....	118	[illegible]
June	71	17	7	7	102	[illegible]
July	60	6	42	.....	108	[illegible]
August	70	30	61	.....	161	[illegible]
September	34	16	28	1	79	[illegible]
October	56	16	36	1	109	[illegible]
November	58	12	38	.....	108	[illegible]
December	63	1	5	.....	69	[illegible]
Total	575	147	249	9	980	[illegible]

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Commerce of Muskingum River during the calendar year ending December 31, 1907—Continued.

LOCK NO. 5.

Month.	Steamboats.	Barges.	Miscellaneous.	Rafts.	Total.	Number of lockages.
January	1	.....	.....	.....	1	1
February	1	.....	.....	.....	1	1
March	11	.....	2	.....	13	11
April	15	.....	1	.....	16	16
May	26	3	2	.....	31	29
June	21	7	2	.....	30	26
July	16	6	11	.....	33	30
August	21	8	36	.....	65	55
September	10	7	16	.....	33	28
October	4	4	13	.....	21	15
November	6	.....	6	.....	12	12
December	14	.....	1	.....	15	15
Total	146	35	90	.....	271	239

LOCK NO. 6.

January	1	.....	.....	.....	1	1
February	1	.....	.....	.....	1	1
March	12	3	1	.....	16	12
April	15	.....	1	.....	16	16
May	8	2	2	.....	12	11
June	22	4	3	.....	29	22
July	12	2	12	.....	26	17
August	19	5	52	.....	76	52
September	5	4	17	.....	26	21
October	3	3	8	.....	14	11
November	7	3	10	.....	20	20
December	13	.....	.....	.....	13	13
Total	118	26	106	.....	250	197

LOCK NO. 7.

January	1	.....	.....	.....	1	1
February	1	.....	.....	.....	1	1
March	12	1	.....	.....	13	12
April	10	.....	1	.....	11	11
May	11	2	1	.....	14	14
June	19	4	6	.....	29	25
July	15	4	13	.....	32	25
August	20	8	26	.....	54	44
September	4	7	10	.....	21	17
October	10	11	4	.....	25	16
November	7	3	.....	.....	10	7
December	13	.....	.....	.....	13	13
Total	123	40	61	.....	224	186

LOCK NO. 8.

January	1	.....	.....	.....	1	1
February	2	.....	.....	.....	2	2
March	38	8	2	.....	48	39
April	62	.....	.....	.....	62	62
May	68	4	.....	.....	72	72
June	78	10	2	.....	90	79
July	82	6	6	.....	94	79
August	82	8	49	.....	139	126
September	62	2	9	.....	73	71
October	65	14	6	.....	85	76
November	65	7	.....	.....	72	65
December	52	.....	.....	.....	52	52
Total	657	54	74	.....	785	724

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Commerce of Muskingum River during the calendar year ending December 31, 1907—Continued.

LOCK NO. 9.

Month.	Steamboats.	Barges.	Miscellaneous.	Rafts.	Total.	Number of lockages.
January	1	.....	.....	.....	1	1
February	2	.....	.....	.....	2	2
March	38	5	.....	.....	43	[illegible]
April	63	.....	.....	.....	63	[illegible]
May	68	6	1	.....	75	[illegible]
June	74	8	6	.....	88	[illegible]
July	78	15	22	.....	115	[illegible]
August	77	24	53	.....	154	[illegible]
September	60	2	17	.....	79	[illegible]
October	66	11	7	.....	84	[illegible]
November	69	13	21	.....	103	[illegible]
December	51	.....	.....	.....	.....	[illegible]
Total	647	84	127	.....	807	[illegible]

LOCK NO. 10.

January	1	.....	.....	.....	1	1
February	2	4	.....	.....	6	[illegible]
March	36	5	1	.....	42	[illegible]
April	62	8	.....	.....	70	[illegible]
May	64	2	3	.....	69	[illegible]
June	82	9	3	.....	94	[illegible]
July	83	6	19	.....	108	[illegible]
August	75	9	14	.....	98	[illegible]
September	57	17	13	.....	87	[illegible]
October	61	11	1	.....	73	[illegible]
November	62	101	4	.....	167	[illegible]
December	68	93	.....	.....	161	[illegible]
Total	653	265	58	.....	976	[illegible]

SUMMARY.

Lock No.	Steamboats.	Barges.	Miscellaneous.	Rafts.	Total.	Number of lockages.
1	994	658	237	27	1,915	[illegible]
2	601	24	154	9	788	[illegible]
3	607	28	101	6	742	[illegible]
4	575	147	249	9	980	[illegible]
5	146	35	90	.....	271	[illegible]
6	118	26	106	.....	250	[illegible]
7	123	40	61	.....	224	[illegible]
8	657	54	74	.....	785	[illegible]
9	647	84	127	.....	807	[illegible]
10	653	265	58	.....	976	[illegible]
Total	5,121	1,361	1,257	51	7,738	[illegible]

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Statement of commerce passing locks on the Muskingum River, Ohio, during the calendar year ending December 31, 1907.

Articles.	Lock No.—									
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Beer	.....	452	416	197	5	5	2	3	16	184
Bone dust	.....	34	33	58	.....	.....	.....	.....	.....	.....
Brick	11	141	143	196	40	3	3	583	619	749
Cattle	519	664	679	617	415	281	174	82	71	52
Coal	160	794	129	296	226	221	275	480	375	1,592
Cement	.....	34	25	5	5	.....	.....	240	295	282
Cement blocks	.....	23	98	82	.....	.....	.....	.....	.....	.....
Corn	51	365	254	407	39	51	35	15	52	72
Cross ties	100	100	.....	.....	.....	.....	.....	.....	2	2
Eggs	2,243	2,283	2,096	2,008	1,623	1,334	957	307	309	151
Flour	78	998	968	689	188	125	123	496	470	406
Hay	446	1,175	1,101	1,000	681	442	286	744	610	1,116
Hogs	119	200	196	210	99	84	59	58	30	30
Horses	166	178	189	245	182	149	126	176	184	162
Ice	.....	309	309	148	.....	.....	.....	.....	.....	12
Iron, manufactured	454	826	778	708	649	505	675	441	454	473
Iron ore	.....	.....	.....	.....	.....	.....	.....	22	17	49
Lime	.....	43	45	18	11	.....	.....	196	245	301
Lumber	1,277	973	815	373	77	51	69	792	799	819
Merchandise, miscellaneous	14,661	14,573	13,253	12,865	7,642	6,893	7,111	12,848	12,915	12,576
Mules	2	2	1	1	1	1	1	2	.....	4
Oil	107	222	196	183	126	118	135	149	185	234
Poultry	150	180	174	163	120	98	103	46	23	11
Produce	.....	220	88	175	.....	.....	.....	3	19	45
Salt	249	276	278	287	196	221	208	133	215	247
Sand and gravel	26,000	.....	.....	2,260	.....	.....	.....	.....	1,200	460
Sheep	11	32	23	23	6	.....	3	3	.....	17
Shingles	.....	26	29	.....	.....	.....	.....	.....	.....	21
Staves	.....	.....	2	8	.....	.....	.....	.....	.....	95
Stoneware	84	86	84	104	55	94	96	119	133	109
Straw	30	366	401	392	198	178	35	1,250	516	632
Sugar	.....	123	64	11	69	7	.....	158	324	671
Timber	300	840	1,126	.....	.....	.....	.....	14	30	.....
Tobacco	.....	.....	.....	.....	.....	.....	.....	5	4	133
Wheat	296	357	622	558	268	256	141	236	92	21
Total	47,514	26,845	24,591	24,289	12,880	11,111	10,570	19,600	20,184	21,708
Passengers	17,617	21,021	17,847	11,296	3,921	4,444	3,319	14,598	20,377	35,994

List of steamboats (stern-wheel) plying on the Muskingum River, between Zanesville and Marietta, Ohio.

Name of steamer.	Length.	Breadth.	Depth.	Draft.	Tonnage.
	Feet.	Feet.	Feet.	Inches.	
Lorena	141	32	5	24	287
Sonoma	125	20	3½	23	116
Valley Gem	125	26½	4	24	156
Vega	104	17½	4	26	90
Merrill	115	22	3½	28	125
Excel a	110	18	3	24	100
Jewel a	120	23	3	18	100
Pioneer City a	100	35	4	24	100
Rival a	150	28	4½	36	175
Ruth a	140	26	3	24	175
Valley Belle a	130	22	3½	24	125
T. M. Pate a	140	28	4	30	140
Darling a	120	24	4	36	125
Bernadina King a	100	18	2½	30	100
Reaper a	160	28	4	36	150
Robert Taylor a	140	26	4	36	140
Carrie V. a	125	20	3	24	90
Conquest a	130	23	3½	24	100
French a	104	19½	4½	26	76
Clarimond a	120	22	4	28	100

a Only occasional trips.

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List of gasoline towboats and pleasure boats plying on the Muskingum River, between Marietta and Beverly, Ohio.

Name of boat.	Character.	Length.	Beam.	Draft.
		Feet.	*Feet.*	*Inches.*
Ajax	Towboat	20	8	
Dalley	do	30	10	
Wander	do	50	13	
Stonewall	do	60	14	
Beaver	do	60	14	
Sid	do	40	12	
Elanore	do	30	14	
Annie M. Shaw	do	60	12	
Shifter	do	40	13	
Hustler	do	35	14	
Helen W	do	40	12	
Calhoun	do	65	13	
Creston	do	40	12	
Carbon Black	do	60	13	
Marietta	Pleasure boat	40	12	
Truscott	do	16	4	
Laken	do	18	4	
Earl	do	14	4	
Beesie	do	12	3	
Ada	do	24	6	
Nixon	do	35	8	
Freda	do	18	6	
Racine	do	20	5	
Lillian	do	14	3	
Booth	do	26	5	
Titley	do	14	5	
Arthur D	do	16	4	
Missen	do	18	5	
Belle B	do	16	5	
Ethel	do	40	8	
Lavina	do	40	6	
May Dell	do	16	5	
Idler	do	14	5	
Avalon	do	18	6	
Grace	do	16	5	
May	do	18	5	
Jim Gay	do	14	5	
Atlas	do	18	6	

List of gasoline boats plying on the Muskingum River between Marietta and Dresden, Ohio.

Name of steamer.	Length.	Breadth.	Depth.	Draft.	Tonnage.
	Feet.	*Feet.*	*Feet.*	*Inches.*	
Outing	47	9	4	30	6
Kill Kare	35	6	3	30	3
Gadabout	21	4½	2½	22	2
Muskingum	18	4	2	13	1
England	16	4	2	12	1
Janette	16	4	2	12	1
Beatty	20	5½	2½	20	2
Alice	18	5	2½	20	2
Bay Lee	18	4½	2	18	2
Uarda	49	16	2½	18	10
Malew	46	10	4½	36	9
Anna Louise	20	4	2	12	1
Kid	76	16	2½	20	10

Muskingum River leases.

Location.	Lessee.	Dated.	Expires.
Year ending April 30, 1908:			
Dam No. 1, Marietta	The Phoenix Mill Co	May 1, 1904	May 1, 1924
Dam No. 2, Devols	Gates & Payne	May 1, 1889	May 1, 1909
Dam No. 3, Lowell	Rechsteiner Bros. and J. S. Brown	May 1, 1890	May 1, 1910
Do	Rechsteiner Bros	do	Do.
Do	do	Nov. 1, 1892	Nov. 1, 1912
Do	F. H. Wolfram	Dec. 2, 1879	Dec. 15, 1909
Do	First National Bank	June 1, 1900	Do.
Do.[a]	E. W. Webster	do	June 6, 1912

[a] Renewed for six years from June 6, 1906.

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Muskingum River leases—Continued.

Location.	Lessee.	Dated.	Expires.
Year ending April 30, 1908—Con.			
Dam No. 4, Beverly	Robbins Bros	May 1, 1889	May 1, 1909
Do	Langenberg & Abrams	May 1, 1890	May 1, 1910
Do	Douglas Groves	....do	Do.
Do	George Walker	May 1, 1901	Do.
Dam No. 6, Stockport	J. S. Torbert	Oct. 25, 1905	Nov. 1, 1925
Dam No. 7, McConnelsville	E. M. Stanbery	Sept. —, 1839	
Do	McConnelsville-Malta Electric Co	Nov. 1, 1890	Nov. 1, 1920
Dam No. 7, Malta	Ohio and Little Kanawha Railroad Co.	May 1, 1890	May 1, 1925
Dam No. 9, Duncans Falls	John Miller	Dec. 31, 1836	
Dam No. 9, Taylorsville	Frazier & Son	....do	
Do. [a]	Chas. U. Shryock	Jan. 12, 1904	May 1, 1924
Do	....do	May 1, 1904	May 1, 1909
Do	....do	Dec. 9, 1905	Nov. 1, 1925
Dam No. 10, Zanesville	John T. Drone	May 1, 1890	May 1, 1910
Do	The Zanesville Rwy. Light and Power Co.	....do	Do.
Do	....do	May 1, 1899	May 1, 1909
Do	....do	Apr. 30, 1903	Apr. 30, 1923
Do	Muskingum Coffin Co	May 1, 1890	May 1, 1910
Do	Zanesville Mantel and Furniture Co.	....do	Do.
Do	T. L. Moorehead	May 1, 1893	May 1, 1913
Do	Muskingum and Ohio River Transportation Co.	Mar. 23, 1903	Nov. 13, 1907
Year ending May 31, 1908.			
Dam No. 10, Zanesville	John Blankenbuhler	June 1, 1892	June 1, 1909
Do	Frederick Abel Estate	....do	Do.

[a] Canceled July 30, 1907.

Muskingum River rentals from leases of land and water power.

Lessee.	Land or water power.	Cubic feet of water per minute.	Annual rental.	Rebate.	Rentals collected.
The Phoenix Mill Co	Water power	12,000	$300.00		$300.00
Gates & Payne	....do	9,000	108.00		108.00
Rechsteiner Bros. & J. S. Brown	....do	7,280	174.72		174.72
Rechsteiner Bros	....do	4,446	106.70		106.70
Do	Land		10.00		10.00
F. H. Wolfram	....do		5.00		5.00
First National Bank	....do		10.00		10.00
E. W. Webster	....do		5.00		5.00
Robbins Bros. [a]	Water power	1,904	100.00		
Langenberg & Abrams	....do	5,600	114.24	$41.54	72.70
Douglas Groves	....do	6,038	109.80	39.93	[b] 124.77
George Walker	....do	5,000	100.00	36.36	63.64
J. S. Torbert	....do	7,315	263.34		263.34
E. M. Stanbery [c]	....do	[d]			
McConnelsville-Malta Electric Co	....do	8,702	208.84		208.84
Ohio & Little Kanawha Railroad Co	Land		2.50		2.50
John Miller [c]	Water power	[c]			
Frazier & Son [c]		[c]			
Chas. U. Shryock	Land		25.00		25.00
Do	....do		32.00		32.00
John T. Drone	Water power	7,560	458.60		458.60
The Zanesville Railway, Light and Power Co.	....do	6,029	361.74		361.74
Do	....do	7,399	443.82		443.82
Do	....do	50,309	1,760.82	466.30	1,294.52
Muskingum Coffin Co	....do	4,619	207.86		207.86
Zanesville Mantel and Furniture Co	....do	4,794	186.96		186.96
T. L. Moorehead	Land		25.00		25.00
Muskingum and Ohio River Transportation Co.	....do		25.00		25.00
John Blankenbuhler	Water power	2,700	100.00		100.00
Frederick Abel Estate	....do	5,200	184.50		184.50
Total					4,795.21

[a] No collections.
[b] Includes $54.90 due April 30, 1907.
[c] Perpetual free lease of water power.
[d] Enough to propel 10 run of 4-foot 5-inch millstones.
[e] Enough to propel 15 run of 4½-foot millstones.

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H H 3.

IMPROVEMENT OF BIG SANDY RIVER, WEST VIRGINIA AND KENTUCKY, AND TUG AND LEVISA FORKS OF SAME.

The natural condition of this river and its forks, and projects for their improvement, are given in the current summary.

Lock No. 1, Big Sandy River.—The work of constructing in concrete the regulating works below the lock under contract with the Baker Contract Company, dated July 17, 1906, now in the hands of a receiver, The Colonial Trust Company, of Pittsburg, Pa., was very much delayed by the continued high water in the Ohio and Big Sandy rivers, and practically nothing was accomplished during the year. On September 3, 1907, the contractor began preparations to resume work, repairing plant and digging parts of it out of the deposits of sand and mud. The roof of the shed in which the cement to be used in this work was stored was badly damaged by a severe hailstorm; the cement was resacked, sorted, and removed to another place of storage for protection from further damage. A cofferdam, inclosing the outer guide wall and an equal length of the inner retaining wall, was begun on October 16, completed on the 24th, and pumped out on the 25th. For the inner wall the accumulated deposit was excavated for 83 feet below lock and partly removed for a further distance of 120 feet. A form for upper part of section 1 was put in place. Practically all of the excavation for the outer wall was done and 202 linear feet of form was built for concrete footing course. Only 52 linear feet of this footing course was placed, due to a freshet in the river which broke into the cofferdam on the 31st, and continued high water prevented any further work during the year. The items of work done under this contract during the year are given in the following statement:

Classification.	Units.	Quantities.	Rate.	Amount.
Excavation	Cubic yards	1,100	$0.80	$880.00
Concrete	do	23	8.50	195.50
Skilled labor	Hours	24	.25	6.00
Unskilled labor	do	24	.15	3.60
Total				$1,085.10

Plans and specifications for the construction of a steel service bridge at this lock, provided for in the river and harbor act of March 2, 1907, were completed and all bids received in response to advertisement dated August 14, 1907, and opened September 3, 1907, for the construction of this bridge, were rejected on account of being excessive. Subsequent to steps taken with a view of doing the work by hired labor and purchase of materials, a freshet in the river so changed the conditions above the weir as to render the use of a pile foundation, as contemplated in the original plan, unsafe. Plans for the construction of the bridge by the use of cribs at the pier end, instead of piles, have been completed.

Lock and Dam No. 3.—Under date of January 30, 1908, a contract was entered into with Mr. J. C. Thomas, of Louisa, Ky., for raising the crest of this lock and dam, authorized in the river and harbor act of June 13, 1902. This contract includes the construction

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of new steel lock gates for the lock, protection work below the abutment and irons for a new set of needles for the pass. Preliminary work was begun in February, material delivered, plant installed, quarry opened, and temporary buildings erected. A cofferdam inclosing the abutment, weir, and pier has been constructed.

Excavation for the extensions to abutment and pier and service-bridge apron for weir was completed, and all round and sheet piles driven. The iron and stone sills of the old weir were removed, all hurters placed, channels for tripping bar and wicket cushion cut, and the greater part of the cutting of old masonry for machinery recesses and junction of concrete was completed. Considerable work was accomplished in cutting recesses in old lock walls for the upper girders of the gates. Practically all of the fixed iron work has been delivered. The work done under this contract is given in the following statement:

Classification.	Unit.	Quantities.	Rate.	Amount.
Excavation	Cubic yards	861	$1.00	$861.00
Bolt holes	Linear feet	257.6	1.00	257.60
Removal of weir sill		(a)	600.00	400.00
Removal of lock gates		(b)	600.00	100.00
Cement	Barrels	3	1.50	4.50
Timber	M. ft. B. M.	4,798	100.00	479.80
Piling	Linear feet	2,462	.75	1,846.50
Iron and steel	Pounds	26,925	.061	2,180.92
Skilled labor	Hours	185	.50	92.50
Unskilled labor	do	976	.30	292.80
Total				6,515.62

[a] Two-thirds complete. [b] One-sixth complete.

Lock No. 1, Tug Fork.—This work was in care of a watchman during the year, who cared for the property and grounds, made minor repairs to buildings, fences, skiffs, etc. Considerable deposit of sand was made by high water in lock chambers, approaches, and on low ground back of lock. Computations of discharge of Tug Fork for determining dimensions of dam and survey for location of permanent buildings were made. Plans and specifications for constructing a dam, guide walls, buildings, etc., authorized in the river and harbor act of March 2, 1907, were prepared. Proposals for the work were invited by advertisement dated June 2, 1908, and opened July 2, 1908; award was recommended to the Ohio River Contract Company of Evansville, Ind., the lowest bidder, at a total cost of $97,782, which provides for the omission of certain items.

Lock No. 1, Levisa Fork.—The work of constructing this lock in concrete under contract dated March 9, 1905, with the Baker Contract Company, now in the hands of a receiver, The Colonial Trust Company of Pittsburg, Pa., was in progress at the beginning of the year and completed on September 24, 1907, except the removal of plant, which still remains on the site, a bond having been given by the said company for the faithful observance of the conditions under which this privilege was granted. The completion of this work was very much delayed by high water; each rise left heavy deposits of sand and mud which had to be removed before work could be resumed. The quoin and miter posts on lock gates were fitted, valve gears set, and gates painted. Spar brackets and gate-operating ma-

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chinery were set and the protection crib and upper and lower wings of lock cofferdam removed. Since the completion of the contract the lock has been in the care of a watchman. The work done under the contract during the year is given in the following statement:

Classification.	Unit.	Quantities.	Rate.	Amount.
Cofferdam timber	M feet B. M.	588	$50.00	$29.40
Timber in permanent work	do	10,504	80.00	840.32
Iron and steel	Pounds	113,484	.06	6,809.04
Skilled labor	Hours	39	.25	9.75
Unskilled labor	do	27	.15	4.05
Total				7,692.56

During the year computations of the discharge of Levisa Fork for determining dimensions of dam and survey for location of permanent buildings were made. Plans and specifications for constructing the dam, guide walls, buildings, etc., authorized in the river and harbor act approved March 2, 1907, were prepared, and in response to advertisement dated May 26, 1908, bids were received and opened June 26, 1908, for doing the contemplated work. Award was recommended to the lowest bidder, James Skene & Sons, of St. Louis, Mo., for $113,627.85, which provides for the omission of certain items.

There were no snagging operations carried on on either of the forks during the year.

Experience with the works thus far completed and forming a part of the proposed navigation system for the Big Sandy River and its forks has shown the necessity for a small dredging plant, towboat, and combined pump and grapple dredge, to aid in the operation and maintenance of the works and the channels connecting them, keeping the lock chambers and approaches clear of deposit, drift, and sunken logs. Estimated cost, $17,500. No estimate will be submitted for additional locks and dams, the matter being already before Congress in form for any action which may be deemed proper. It was stated in the final report of the survey of this river, upon which the project is based, that the value of the improvement could be foretold with certainty after the completion of four dams above Louisa on each of the forks. Until this improvement shall have reached this stage any estimate of its commercial value must be more or less conjectural.

The aggregate of the lowest bids received for construction of Dam No. 1, Tug Fork, and Dam No. 1, Levisa Fork, was $235,409; adding to this $23,540.90 for engineering and contingent expenses makes the total $258,949.90 for the works, complete, as contemplated by the action of Congress. It is proposed to enter into contract for the construction of these works with the omission of certain authorized items specified in the specifications, which will reduce the aggregate cost to $211,409.85. The items to be omitted in the construction of Dam No. 1, Tug Fork, are: The office building, one dwelling, one outbuilding, excavation for the upper and lower approaches, and the embankment behind the guide wall. The items to be omitted in the construction of Levisa Fork Dam are: The office building, one dwelling, one outbuilding, and the upper guide wall.

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Using the lowest bid received for the construction of the two dams above referred to as a basis upon which to estimate the cost of construction of subsequent dams on these forks, it is recommended that the project be modified so as to increase the cost of each dam to $130,000.

Commercial statistics are reported under the head of "Operating and care," etc.

Money statement.

July 1, 1907, balance unexpended	$207,751.13
Received from various sources	105.29
Amount appropriated by sundry civil act approved May 27, 1908	85,000.00
	292,856.42
June 30, 1908, amount expended during fiscal year, for works of improvement	21,273.16
July 1, 1908, balance unexpended	271,583.26
July 1, 1908, outstanding liabilities	1,225.00
July 1, 1908, balance available	270,358.26
July 1, 1908, amount covered by uncompleted contracts	40,898.71
Amount (estimated) required for completion of existing project	3,755,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement $50,000.00	
For maintenance of improvement 20,500.00	70,500.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

July 18, 1878	$12,000.00	June 6, 1900 (allotted)	$2,000.00
March 3, 1879	12,000.00	March 3, 1901	140,000.00
June 14, 1880	55,000.00	June 13, 1902	178,000.00
March 3, 1881	50,000.00	March 3, 1903	50,000.00
August 2, 1882	25,000.00	March 3, 1905 (river and harbor)	43,000.00
July 5, 1884	50,000.00	March 3, 1905	85,000.00
August 5, 1886	30,000.00	June 30, 1906	40,000.00
August 11, 1888	31,500.00	March 2, 1907	107,000.00
September 19, 1890	36,000.00	May 27, 1908	85,000.00
July 13, 1892	55,000.00	Received from other sources	1,810.92
August 18, 1894	45,000.00		
June 3, 1896	33,000.00		
March 3, 1899	52,500.00		
June 6, 1900	280,000.00	Total	1,498,810.92

CONTRACTS IN FORCE.

CONTRACT FOR CONSTRUCTING GUIDE AND RETAINING WALLS AND PAVING AT LOCK NO. 1, BIG SANDY RIVER, WEST VIRGINIA AND KENTUCKY.

Name of contractor: Baker Contract Company.
Date of approval: August 15, 1906.
Date of Beginning: Delivery of material must begin within thirty days after receipt of notice of approval of contract.
Date of expiration: December 31, 1906.

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Items.		Contract price (unit rate).
Plan No. 1.		
Excavation	cubic yard	
Embankment	do	
Concrete	do	
Ballast	do	
Riprap	do	
Steel	pound	
Paving.		
Paving	cubic yard	
Ballast	do	

CONTRACT FOR RAISING CREST OF LOCK AND DAM NO. 3, BIG SANDY RIVER, NEAR LOUISA, KY., AND CONSTRUCTING STEEL LOCK GATES.

Name of contractor: J. C. Thomas.
Date of approval: February 12, 1908.
Date of beginning: March 7, 1908.
Date of expiration: December 31, 1908.

Items.		Contract prices.
Excavation	cubic yard	
Embankment	do	
Concrete	do	
Riprap	ton	
Paving	square yard	
Bolt holes	linear feet	
Removal of weir sill		
Removal of lock gates		
Placing pass trestles		
Cement	barrel	
Timber	M feet B. M.	
Lumber	do	
Piling	linear feet	
Gauges	do	
Iron and steel	pound	
Skilled labor	hour	
Unskilled labor	do	

NOTE.—Steel gates for the lock, protection below abutment, and irons for needles, included in the above contract will be paid for from the indefinite appropriation for operating and care of canals and other works of navigation, applied to Big Sandy River.

H H 4.

OPERATING AND CARE OF LOCKS AND DAMS ON THE BIG SANDY RIVER, WEST VIRGINIA AND KENTUCKY.

Under an allotment from the indefinite appropriation for operating and care of canals and other works of navigation there has been expended during the year $22,734.53.

OPERATIONS DURING THE FISCAL YEAR.

Lock No. 1, Catlettsburg, Ky.—This lock and dam was not in operation during the year, as it was undergoing repairs and necessary

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additions. On account of continued high water, all repair and construction work was delayed and a great deal of intended work entirely prevented. The work of repairing the dam, which was badly damaged during the previous year, was practically completed; the weir cleaned off and tripping bar guides adjusted; a great accumulation of drift, logs, and ties removed from the pass; the trestle chain recovered and mended; chain pocket wheel reconstructed; trestles raised and broken heads repaired; minor repairs were made to the buildings, lock appliances, and drains; the installation of butterfly valves in the upper lock gate was partially completed; sand deposits were removed from above and below the lock gates. At the beginning of the year contracts were in force for furnishing and delivering stone and timber for the construction of crib work and riprap protection to the river bank below abutment on the West Virginia side, the necessary drift bolts being on hand.

The delivery of stone under contract with McKay & Runyon, of Catlettsburg, Ky., dated May 11, 1907, was completed August 27. Under this contract 3,020 tons of stone were delivered, at $1.70 per ton; of this, 2,335 tons, amounting to $3,970.75, were delivered during the fiscal year. The contract with J. W. Harris, of Catlettsburg, Ky., dated May 29, 1907, for furnishing and delivering timber, was completed August 31. Under this contract 84,480 feet B. M. of timber was delivered, at $22 per thousand, amounting to $1,858.56. This work was begun in October, and during the remainder of the year 208 linear feet of crib work was constructed and protected, using 39,341 feet B. M. of timber and about 875 tons of stone. Amount expended on this work during the year was $7,579.26. The workshop was repaired and enlarged; the old shop was raised 2 feet, new sills, joists, floor, and studding placed, and the building rearranged for use as a storehouse and blacksmith shop combined. A light push boat was purchased for general use at the lock; large deposits of sand and mud were removed from the lock walls and approaches; shop and storehouse painted; fencing repaired, and gate built across wagon entrance to the reservation. This work was done by the regular employees. The grounds, where not occupied by contractors, were cared for and shade trees planted. The lock was not in use during the year. The dam was maneuvered as follows:

August 2, weir raised for cleaning and inspection.
August 23, weir lowered on account of freshet.
August 28, weir raised.
September 20, pass closed and pool allowed to fill.
October 4, weir opened to wash away sand below.
October 5, entire weir lowered.
October 6, pass opened.

Navigation was suspended between September 20 and October 6, on account of the pass being closed and the lock not in use.

Lock No. 2, Kavanaugh, Ky.—This lock and dam was in commission throughout the year. The maneuvers of the dam were as follows:

July 7, dam raised.
July 12, weir lowered and five bays of pass needles escaped.
August 24, two bays of pass needles escaped and trestles lowered.
September 17–19, dam raised.

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October 4, nine weir wickets lowered and pool drawn to assist work at Lock No. 1.
October 7, weir closed.
October 8–9, dam lowered.
October 15–16, dam raised.
November 10–11, dam lowered.
June 15–16, pass raised, but weir left down on account of small freshet.
June 21, pass lowered on account of sudden freshet.

The work of grading and sodding slopes was continued, and large amounts of deposits were removed from slopes, paving, and lock walls; 1,043 square yards of sod was purchased and laid. The high level cylindrical valve at head of lock wall was repaired with new valve cylinder and spider. A concrete walk, 300 feet long and 2 feet 6 inches wide, was laid connecting the house walks with the entrance to the grounds. A small coal shed was built by the regular force. A fire pump with 150 feet of 2½-inch hose was purchased for use in washing off deposit, cleaning out valves, etc. Minor repairs were made to dwellings and lock and the grounds mowed and cared for.

Lock No. 3, Louisa, Ky.—This lock and dam, which has not been in use during the year, was badly damaged in the summer of 1905. Navigation, however, was not suspended, the pass having been continuously open. Under date of January 30, 1908, a contract was entered into with Mr. J. C. Thomas, of Louisa, Ky., for raising the crest of the lock and dam. New steel lock gates, protection of the bank below abutment, and irons for the needles are items included in this contract and payable from the indefinite appropriation for operating and care of canals and other works of navigation, as applied to this river. The amount of work done under this contract during the year and which is chargeable to this appropriation is given in the following statement:

Iron and steel, 2,143 pounds, at $0.081	$173.58

The work of constructing the workshop and tool house, combined, was continued throughout the year by the regular lockmen, assisted at times by hired labor. The concrete foundation was completed, cement blocks made and laid, joists, rafters, slate roof, windows, doors, etc., placed and part of the floor and ceiling put in. All material for this building, including a 6-horsepower gas engine is on hand, and the building will be completed by the regular force when their services are not needed elsewhere. A maneuvering boat for use at this lock was partially constructed during the year, the regular force doing most of the work, assisted at times by hired labor. The hull was launched on April 1. A few minor details are necessary to be done to complete the cabin and derrick, and the fittings on engine and boiler remain to be placed. Under contract with Augustus Snyder, of Louisa, Ky., dated February 12, 1908, a frame storehouse, with concrete floor, was completed June 24, at a cost of $750. Longleaf yellow pine timber for the construction of 130 needles for the pass was purchased and received in April, was unloaded, inspected, hauled to site, and stacked. Minor repairs were made to the buildings, down spouts, fly screens, etc.

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Summary of expenditures for operating and care of locks and dams on Big Sandy River, West Virginia and Kentucky, for the fiscal year ending June 30, 1908.

Services	$12,227.12
Supplies	503.76
Materials	9,823.33
Fuel	41.40
Miscellaneous expenses	638.92
Total	22,734.53

ALLOTMENTS.

July 23, 1897	$2,840.00	March 14, 1906	$4,950.00
July 23, 1898	3,250.95	July 28, 1906	16,015.19
July 19, 1899	3,524.28	March 1, 1907	13,700.00
July 18, 1900	3,177.09	July 8, 1907	34,435.85
July 10, 1901	3,658.12	August 1, 1907	1,925.00
July 17, 1902	5,075.88	Received from other sources	4.25
July 18, 1903	2,677.98		
July 11, 1904	2,950.48	Total	112,615.34
October 31, 1904	1,650.00		
July 31, 1905	12,780.27		

CONTRACTS IN FORCE.

EMERGENCY CONTRACT FOR FURNISHING AND DELIVERING STONE AT THE SITE OF LOCK NO. 1.

Name of contractor: McKay & Runyon.
Date of contract: (Emergency contract.)
Date of beginning and date of expiration: To be completed on or before August 15, 1907.

Item.	Contract price per ton.
Stone for constructing cribwork, etc., at Lock No. 1, Big Sandy River, Catlettsburg, Ky..	$1.70

Completed.

EMERGENCY CONTRACT FOR FURNISHING AND DELIVERING TIMBER AT THE SITE OF LOCK NO. 1.

Name of contractor: J. W. Harris.
Date of contract: (Emergency contract.)
Date of beginning and date of expiration: To be completed on or before July 1, 1907.

Item.	Contract price per M feet B. M.
Timber for constructing crib work, etc., at Lock No. 1, Big Sandy River, Catlettsburg, Ky.	$22.00

Completed.

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CONTRACT (EMERGENCY) FOR CONSTRUCTING STOREHOUSE AT LOCK NO. 3, BIG SANDY RIVER, WEST VIRGINIA AND KENTUCKY.

Name of contractor: Augustus Snyder.
Date of contract: February 12, 1908.
Approval of contract: (Emergency contract.)
Date of beginning and date of expiration: Within ten days after date of receipt of one number of contract and complete same on or before June 30, 1908.

Item.	Contract price.
For constructing storehouse at Lock No. 3, Big Sandy River, West Virginia and Kentucky	$750.00

COMMERCIAL STATISTICS.

[Big Sandy River, West Virginia and Kentucky, including Tug and Levisa forks, for calendar years ending December 31, 1907, and prior years.]

Articles.	1902.	1903.	1904.	1905.	1906.	1907.
	Tons.	*Tons.*	*Tons.*	*Tons*	*Tons.*	*Tons.*
Timber	250,000	134,035	98,459	123,456	168,830	84,497
Hides	15	22	297	15	14	8
Leather	1	3	1			
Lumber	93	379	862	225	144	85
Produce	6,000	52	30	9	169	131
Live stock	726	494	139	44	102	71
Spokes	55	1,763	1,108	148		
Staves	1,720	1,604			4	
Tan bark	35					
Ties	44,067	123,260	33,352	18,781	22,463	106,138
Grain	195	1,674	867	33	811	776
Wool	2	2	1	1		
Miscellaneous	47,614	26,017	16,718	5,868	12,915	2,928
Total	350,523	289,305	151,834	148,530	205,452	194,634
Number of passengers	412	1,096	243	93	449	619

List of boats plying Big Sandy River, West Virginia and Kentucky, and Tug and Levisa forks of same.

Name of boat.	Character.	Length.	Breadth.	Depth.	Tonnage.
		Feet.	*Feet.*	*Feet.*	
Sea Lion	Stern-wheel	123.00	22.00	3.50	127.00
Cando	do	117.50	20.00	3.00	74.00
Thealka	Side-wheel	116.00	19.20	3.20	45.00
Guyandotte	do	104.00	16.00	2.80	43.88
Emma Marie	Stern-wheel	93.00	15.00	2.50	73.00
Leni Leoti	do	90.00	18.33	2.33	75.00
Sea Gull	Side-wheel	90.00	12.00	2.60	30.24
Natchez	do	82.00	8.75	1.42	12.97
Monie Bauer	Stern-wheel	73.00	17.50	2.00	45.00
Mildred Runyon[a]	do	58.00	12.00	1.83	13.00
Polly[a]	do	57.00	12.00	1.67	13.00
Hazel[a]	do	57.00	12.00	1.33	13.00
Ollie S.[a]	do	56.00	12.00	2.00	13.00
Annie M. Shaw[a]	do	55.90	11.00	1.10	12.00
Gordon Nigh[a]	do	55.00	8.83	2.50	
Andree Maxine[a]	do	52.70	12.00	1.67	11.00
Little Bill[a]	do	51.00	8.00	1.33	10.00
Marie[a]	do	47.00	8.00	1.17	8.00
Cricket	do				

[a] Gasoline boats.

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H H 5.

IMPROVEMENT OF KENTUCKY RIVER, KENTUCKY.

The natural condition of this work and projects for its improvement are described and reference for more extended information given in the current summary.

OPERATIONS DURING THE FISCAL YEAR.

Lock and Dam No. 12.—Under contract with William Preston Eckley, of Winchester, Ky., the lock keeper's dwellings, outbuildings, office building, and cisterns were completed on December 4, 1907, at a total cost of $7,773.68. The work under contract with the Ohio River Contract Company, dated June 2, 1907, for constructing the lock and dam has been in progress throughout the year. At the beginning of the year the preliminary work of assembling plant, delivery of material, etc., was in progress. Actual construction was begun in May, and at the close of the year the land wall of lock had been completed to an average height of 12 feet, and excavation for protection wall on abutment side was well under way. The following is a statement of the work done under this contract during the year:

Classification.	Quantities.	Rate.	Amount.
Earth excavation ..... cubic yards..	16,710	$0.35	$5,848.50
Rock excavation ..... do....	16	2.00	32.00
Embankment ..... do....	2,125	.47	998.75
Concrete ..... do....	1,095.51	5.00	5,477.55
Cement ..... barrels..	1,113.25	2.40	2,671.80
Shoring ..... M feet B. M..	1,000	100.00	100.00
Iron and steel ..... pounds..	288	.075	21.60
Total	.....	.....	15,150.20

Lock and Dam No. 13.—This site, which has been purchased and paid for, is located about 3 miles below Willow Shoals Station, and at the close of the year plans and specifications for the construction of this work are in a state of advancement.

Lock and Dam No. 14.—This site, which is located near Heidelberg, Ky., has been purchased and paid for. The preparation of plans and specifications for its construction has not been undertaken, due to the fact that it was not provided for in any existing legislation.

Survey party.—A survey party was in the field during the latter part of the year making survey of private property overflowed by reason of the construction of Locks and Dams Nos. 9, 10, and 11. This survey was extended to and included all land submerged when the river was at pool stage, and also at stages of 5 and 10 feet above the dam. These surveys have been made for the purpose of securing such information and data as was possible for use in the preparation of the Government's defense to suits that have been filed for damages due to this flowage.

Commercial statistics are given in the report for operating and care of locks and dams on the Kentucky River, Kentucky.

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Money statement.

July 1, 1907, balance unexpended	$259,883.36
Received from other sources	128.00
Amount appropriated by sundry civil act approved May 27, 1908	309,000.00
	569,011.36
June 30, 1908, amount expended during fiscal year for works of improvement	24,129.92
July 1, 1908, balance unexpended	544,881.44
July 1, 1908, outstanding liabilities	472.06
July 1, 1908, balance available	544,409.38
July 1, 1908, amount covered by uncompleted contracts	378,409.94
Amount (estimated) required for completion of existing project	1,538,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement $345,000.00	
For maintenance of improvement 11,000.00	
	356,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

March 3, 1879	$100,000.00	June 6, 1900	$75,000.00
June 14, 1880	100,000.00	March 3, 1901	150,000.00
March 3, 1881	125,000.00	June 28, 1902	200,000.00
August 3, 1882	225,000.00	March 3, 1903	200,000.00
July 5, 1884	250,000.00	March 3, 1905	50,000.00
August 5, 1886	187,500.00	March 2, 1907	100,000.00
August 11, 1888	180,000.00	March 4, 1907	75,000.00
September 19, 1890	180,000.00	May 27, 1908	99,000.00
July 13, 1892	150,000.00	May 27, 1908	210,000.00
August 18, 1894	125,000.00	Received from other sources	7,821.28
June 3, 1896	50,000.00		
June 3, 1896	83,000.00	Total	3,472,321.28
June 4, 1907	200,000.00		
July 1, 1898	350,000.00		

CONTRACTS IN FORCE.

CONTRACT FOR BUILDING TWO DWELLINGS, TWO OUTBUILDINGS, TWO CISTERNS, ONE OFFICE BUILDING, AND ONE WELL AT LOCK NO. 12, KENTUCKY RIVER, KENTUCKY.

Name of contractor: William Preston Eckley.

Date of Approval: July 3, 1907.

Date of beginning and date of expiration: Within ten days after date of notification of approval of contract, and be completed on or before October 31, 1907.

Item.	Contract price (unit rate).
Excavation ..... cubic yard..	$0.40
Concrete ..... do....	7.00
Well ..... linear foot..	2.00
Timber work ..... M feet B. M..	24.00
Drains ..... linear foot..	.20
Dwellings ..... each..	2,650.00
Outbuildings ..... do....	315.00
Office building	375.00
Cisterns ..... each..	120.00

Completed.

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CONTRACT FOR BUILDING LOCK AND DAM NO. 12, KENTUCKY RIVER, KENTUCKY.

Name of contractor: The Ohio River Contract Company.
Date of approval: July 6, 1907.
Date of beginning: Within twenty days after date of notification of approval of contract.
Date of expiration: November 30, 1909.

Item.		Contract price (unit rate).
Earth excavation	cubic yard..	$0.35
Rock excavation	do....	2.00
Embankment	do....	.47
Ballast	do....	1.35
Concrete	do....	5.00
Paving	do....	6.50
Derrick stones	ton..	2.50
Riprap	square yard..	2.50
Cement	barrel..	2.40
Timber	M feet B. M..	100.00
Shoring	do....	100.00
Iron and steel	pound..	.07½
Gauges	linear foot..	2.00
Drains	do....	.45
Fencing	do....	.20

H H 6.

OPERATING AND CARE OF LOCKS AND DAMS ON KENTUCKY RIVER, KENTUCKY.

Under allotment from the indefinite appropriation for operating and care of locks and dams and other works of navigation there has been expended during the year the sum of $119,223.79.

The system comprises eleven locks and fixed dams, Dam No. 11, however, having a movable crest.

Navigation was suspended on account of high water and making necessary repairs to the various locks for a total period of 240 days.

The following work, in addition to the ordinary lock operation, was done during the year:

Lock No. 1.—Purchased posts and fence rails to replace old fence washed out by high water.

Lock No. 2.—Made minor repairs to upper river crib.

Lock No. 3.—Renewed 247 linear feet of the downstream face of timber step dam with a 3-foot layer of concrete; made temporary repairs to portion of dam which was not renewed in concrete with 11,660 feet B. M. timber. Minor repairs were made to the lock houses.

Lock No. 4.—Twenty thousand four hundred feet B. M. timber was used in renewing worn-out and torn-off sheeting of dam; reconstructed, in concrete, the lower miter sill of lock; made minor repairs to lock houses and grounds.

Lock No. 5.—Tore down to upper pool level upper guide wall with a view to rebuilding in concrete; the face of the crib, however, was rebuilt with new timber. Expended 19,233 feet B. M. timber in renewing the torn-off and worn-out sheeting on dam. The two steel lock gates for the upstream end of lock, constructed under contract with the Riverside Bridge Company, dated December 1, 1906, were completed, at a cost of $1,848.87, and were erected in position at a total cost of $2,506.04. The upper miter sill of lock was recon-

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structed in concrete. Minor repairs to lock houses and grounds were made.

Lock No. 6.—Purchased materials for repairing lower wall valve and made minor repairs to lock houses and grounds.

Lock No. 8.—The entire downstream face of old timber step dam was removed and renewed with a sloping concrete face about 4 feet thick; 1,039 cubic yards of concrete was incorporated in this work, at a cost of $4,192.27. Repaired upper slope paving.

Lock No. 9.—Placed 654 cubic yards of riprap at lower end of lock grounds for bank protection. Made minor repairs to lock houses and grounds.

Lock No. 10.—The work of repairing the damage to this lock, caused by the flood of March, 1905, under contract with Frank J. Cullen, of Chicago, Ill., dated April 19, 1906, was completed. The amount expended under the contract during the year was 776 feet B. M. timber, at $55 per thousand, $42.68. Protection work was constructed below abutment consisting of a concrete wall, on which there was expended 890 cubic yards of concrete and 3,076 cubic yards of riprap, at a cost of $11,977.63. Reenforced with concrete the concrete wall at lock end of new dam with 221 cubic yards of concrete, at a cost of $897.04. Raised the level of lower guide wall to level of lock, using 520 cubic yards of concrete, at a cost of $2,460. Constructed concrete walk along top of dike and from river to the foot of the hill and over the lock grounds to house. Total length of walk, 530 feet; cost, $440. Widened, with concrete, the land wall of lock sufficiently to properly operate the gate racks, at a cost of $200. Constructed a floating boom at upper end of lock wall to facilitate entrance to lock, at a cost of $500. Made minor repairs to lock houses and grounds, including the construction of a new fence around United States reservation on lock side of river, at a cost of $350.

Lock No. 11.—Purchased 6 new trestles and 26 frames for the protection of trestles from logs and drift, at a cost of $490.03. Made minor repairs to lock houses and grounds.

The U. S. steamer *General O. M. Poe* was employed during the working season as dredge tender, transporting and towing supplies and material for the various locks, making inspection trips, and assisting in the repair work. Minor repairs were made to her hull and her machinery was overhauled, repaired, and adjusted.

Number of miles run	3,605.1
Number of boats and barges towed	421
Number of miles towed boats and barges	3,075.2

The U. S. dredge *No. 1* was employed during the working season in assisting in repair work at the various locks, removing deposit from lock entrances, and dredging channels. The total amount excavated was 36,905 cubic yards, at an average cost of $0.1244 per cubic yard. Minor repairs were made to her operating machinery, and timber purchased for repairs to hull.

The U. S. dredge *No. 2* was employed during the working season in assisting in the repair work at Lock No. 10 and removing deposit from lock entrances and lock pits. Total amount excavated was 14,529 cubic yards, at an average cost of $0.3322 per cubic yard.

The U. S. launch *Pearl* was employed throughout the year in making inspection trips, delivering supplies at the several locks, occasionally tending dredge *No. 2*, and was used in connection with mak-

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ing a survey of overflowed lands caused by reason of construction of Locks Nos. 9, 10, and 11, and while engaged on this work the cost of her operation was paid from the appropriation for improving Kentucky River, Kentucky. Made minor repairs to hull and machinery.

Minor repairs were made to derrick boats, quarter boats, barges, and scows.

Under contract with the Monongahela River Consolidated Coal and Coke Company, of Pittsburg, Pa., dated May 24, 1907, two new dump scows were completed and delivered, at a cost of $6,216.

Under contract with the Kanawha Dock Company, of Point Pleasant, W. Va., dated February 27, 1908, two new barges were constructed and delivered, at a cost of $4,300.

Under contract with the Dixie Towing Company, dated August 6, 1907, an additional towboat was hired for a period of 73 days, at a cost of $1,752.

Under contract with the Dixie Towing Company, dated September 5, 1907, an additional barge was hired for a period of 116 days, at a cost of $464.

The construction of a new dredge boat to replace U. S. dredge *No. 2* is under way. A contract for the machinery was entered into under date of May 19, 1908; contract price, $6,545; and the hull is to be constructed by the hire of labor and purchase of materials.

At the close of the year preparations are being made for the construction of a new towboat to replace the U. S. steamer *General O. M. Poe.*

Summary of expenditures for operating and care of locks and dams on Kentucky River, Kentucky, for fiscal year ending June 30, 1908.

Services	$66,536.63
Supplies	5,135.96
Materials	31,182.80
New plant	7,971.79
Fuel	6,844.85
Miscellaneous	1,551.76
Total	119,223.79

ALLOTMENTS.

July, 1884	$15,000.00	May 11, 1900	$2,500.00
July, 1885	27,615.00	July 17, 1900	82,284.09
July 31, 1886	33,965.00	July 9, 1901	109,137.49
July, 1887	79,862.14	August 19, 1901	952.00
July, 1888	82,478.50	February 4, 1902	19,000.00
July 28, 1889	72,394.80	July 22, 1902	79,634.91
July 17, 1890	28,889.07	July 20, 1903	56,971.61
July 16, 1891	36,331.38	July 13, 1904	56,953.04
November 28, 1891	1,112.50	May 18, 1905	10,000.00
December 14, 1891	11,382.80	July 17, 1905	112,480.53
July 15, 1892	38,503.62	October 12, 1905	15,867.00
June 13, 1893	2,000.00	February 28, 1906	117,305.00
July 14, 1893	73,065.02	July 28, 1906	74,816.64
July 16, 1894	46,435.28	July 19, 1907	144,626.79
July 20, 1895	59,120.04	Received from other sources	290.34
July 24, 1896	70,198.85		
August 2, 1897	49,272.11	Total	1,727,861.18
July 15, 1898	53,531.39		
July 29, 1899	63,884.24		

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CONTRACTS IN FORCE.

CONTRACT FOR CONSTRUCTING A DAM WITH ABUTMENT AND PROTECTION CRIB, A DIKE, ONE DWELLING HOUSE, ONE OFFICE BUILDING, TWO CISTERNS, AND REPAIRS TO OLD DWELLING AND TWO OUTHOUSES AT LOCK NO. 10, KENTUCKY RIVER, AT FORD, KY.

Name of contractor: Frank J. Cullen.
Date of approval: April 28, 1906.
Date of beginning and date of expiration: To be commenced on or before May 31, 1906, and to be completed on or before December 31, 1906.

Item.		Contract price.
Excavation	cubic yard..	$0.67
Embankment	do....	.53
Concrete	do....	6.25
Stone filling	do....	1.10
Riprap	do....	1.75
Timber	M feet B. M..	55.00
Iron and steel	pound..	.10
Driftbolts	do....	.05
Dwelling house		2,400.00
Office		300.00
Cisterns	each..	100.00
Repairs to old buildings:		
Dwelling house		1,000.00
Outbuildings	each..	75.00

Completed.

CONTRACT (EMERGENCY) FOR STEEL LOCK GATES FOR LOCK NO. 5, KENTUCKY RIVER, KENTUCKY.

Name of contractor: Riverside Bridge Company.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: To be commenced within 10 days after date of signature of contract, and to be completed on or before March 30, 1907.

Item.		Contract price (unit rate).
Steel lock gates for Lock No. 5, Kentucky River	pound..	$0.05½

Completed.

CONTRACT FOR CONSTRUCTING AND DELIVERING TWO DUMP SCOWS.

Name of contractor: The Monongahela River Consolidated Coal and Coke Company.
Date of contract: June 18, 1907.
Date of beginning and date of expiration: To commence within 10 days after date of notification of approval of contract, and to be completed within 75 days after such notification.

Item.		Contract price.
For constructing and delivering 2 dump scows at Lock No. 1, Kentucky River	each..	$6,100

Completed.

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CONTRACT FOR HIRE OF BARGE.

Name of contractor: Dixie Towing Company.
Date of contract: September 5, 1907.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: To expire in 120 days from two days of signature to contract.

Item.	Contract price (unit rate).
For hire of barge for use in connection with the transportation of sand and gravel for use in repair work on Kentucky River, Kentucky.....per day..	$4

Completed.

CONTRACT FOR THE CONSTRUCTION AND DELIVERY OF TWO BARGES FOR USE ON THE KENTUCKY RIVER, KENTUCKY.

Name of contractor: Kanawha Dock Company.
Date of contract: February 27, 1908.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: Within ten days after receipt of one number of contract and complete same on or before June 30, 1908.

Item.	Contract price (unit rate).
For constructing 2 barges for use on the Kentucky River, Kentucky.....	$4,300

Completed.

CONTRACT FOR FURNISHING AND DELIVERING A DIPPER DREDGE.

Name of contractor: The Marion Steam Shovel Company.
Date of contract: May 19, 1908.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: Within ten days after signature to contract and complete within seventy-five days thereafter.

Item.	Contract price.
For furnishing and delivering at Frankfort, Ky., machinery for dipper dredge.....	$6,545

CONTRACT (EMERGENCY) FOR FURNISHING AND DELIVERING ABOUT 4,300 BARRELS OF AMERICAN PORTLAND CEMENT AT FRANKFORT AND FORD, KY.

Name of contractor: Virginia Portland Cement Company.
Date of contract: August 22, 1907.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: Not fixed.

Item.	Contract price (unit rate).
Delivered at Frankfort, Ky., 1,800 barrels American Portland cement.....per barrel..	$2.08
Delivered at Ford, Ky., 2,500 barrels American Portland cement.....do....	1.96

Completed.

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CONTRACT FOR HIRE OF TOWBOAT AS DREDGE TENDER.

Name of contractor: Dixie Towing Company.
Date of contract: August 6, 1908.
Date of approval: (Emergency contract.)
Date of beginning and date of expiration: When ordered.

Item.	Contract price (unit rate).
For furnishing towboat and crew for service in connection with the United States dredge.....per day..	$24

Completed.

COMMERCIAL STATISTICS.

Statement of traffic passing the locks on Kentucky River during the calendar years 1904, 1905, 1906, and 1907.

Lock—	Passenger boats.				Towboats.				Government boats.			
	1904.	1905.	1906.	1907.	1904.	1905.	1906.	1907.	1904.	1905.	1906.	1907.
No. 1	407	418	489	417	294	390	744	864	64	8	16	8
No. 2	386	379	482	432	252	309	601	718	71	27	26	29
No. 3	169	155	192	165	219	266	376	487	95	49	26	45
No. 4	199	159	183	156	269	352	477	588	197	62	41	71
No. 5	153	139	89	83	219	323	361	392	44	64	79	94
No. 6	128	104	88	82	200	278	273	324	46	56	45	56
No. 7	120	108	86	78	208	261	240	319	34	52	46	88
No. 8	98	67	87	59	128	157	139	258	31	57	48	47
No. 9	44	4	.....	37	98	309	27	269	.....	11	6	29
No. 10	.....	.....	.....	5	.....	31	51	331	.....	12	.....	89
No. 11	.....	.....	.....	5	.....	.....	.....	328	.....	.....	.....	19
Total	1,704	1,533	1,696	1,519	1,877	2,676	3,289	4,878	603	396	333	482

Lock—	Coal barges.				Other barges.				Small crafts.			
	1904.	1905.	1906.	1907.	1904.	1905.	1906.	1907.	1904.	1905.	1906.	1907.
No. 1	116	222	256	356	288	217	227	248	47	49	28	41
No. 2	86	185	217	354	233	186	220	207	48	41	56	71
No. 3	92	166	200	337	699	169	188	195	51	69	78	69
No. 4	92	178	212	345	307	189	236	208	90	70	162	187
No. 5	28	42	28	72	177	197	204	221	48	59	71	45
No. 6	28	11	15	80	191	197	143	148	128	81	93	73
No. 7	10	12	18	32	199	149	113	158	128	95	108	85
No. 8	.....	2	.....	4	158	128	65	89	112	44	82	35
No. 9	.....	.....	1	4	245	27	105	90	145	1,566	17	137
No. 10	.....	.....	1	6	.....	15	17	222	.....	4	6	45
No. 11	.....	.....	.....	2	.....	.....	.....	68	.....	.....	.....	88
Total	442	818	948	1,544	2,492	1,474	1,526	1,849	797	2,059	702	782

Lock—	Rafts.				Total.				Increase (+) or decrease (−) over 1906.
	1904.	1905.	1906.	1907.	1904.	1905.	1906.	1907.	
No. 1	818	726	757	783	2,033	2,021	2,527	2,719	+ 192
No. 2	822	689	682	743	1,898	1,816	2,486	2,545	+ 59
No. 3	792	718	662	716	2,117	1,587	1,722	2,007	+ 285
No. 4	844	700	659	617	1,998	1,710	1,970	2,092	+ 122
No. 5	1,272	2,097	1,373	2,206	1,941	2,921	2,205	3,113	+ 908
No. 6	1,288	2,359	1,641	2,807	2,009	3,086	2,297	3,520	+1,223
No. 7	1,359	2,282	1,652	2,771	2,058	2,959	2,263	3,490	+1,227
No. 8	1,728	2,360	1,809	2,888	2,250	2,815	2,220	3,380	+1,160
No. 9	1,857	2,206	1,774	2,873	2,406	4,113	1,980	3,430	+1,500
No. 10	.....	1,815	1,509	2,637	.....	1,877	1,564	3,299	+1,715
No. 11	.....	.....	.....	3,133	.....	.....	.....	3,643	
Total	10,780	15,947	12,508	22,174	18,705	24,905	21,214	33,238	

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Statement of traffic passing the locks on Kentucky River during the calendar years 1904, 1905, 1906, and 1907—Continued.

Locks—	Total tonnage.				Lockages.				Increase (+) or decrease (−) over 1906.
	1904.	1905.	1906.	1907.	1904.	1905.	1906.	1907.	
No. 1	186,940	213,024	227,359	256,126	1,356	1,386	1,796	1,858	+ 62
No. 2	166,776	189,125	224,989	252,995	1,891	1,391	2,467	2,054	− 413
No. 3	230,278	164,692	181,995	227,521	1,554	1,182	1,807	1,550	+ 243
No. 4	174,560	166,443	194,722	262,946	1,415	1,300	1,488	1,761	+ 273
No. 5	161,517	225,517	172,272	255,457	1,169	1,632	1,233	1,628	+ 395
No. 6	158,250	235,597	172,717	257,253	1,092	1,370	1,086	1,484	+ 398
No. 7	163,932	220,790	165,968	250,329	992	1,478	1,068	1,525	+ 462
No. 8	174,094	202,052	160,252	234,593	1,001	1,085	1,000	1,436	+ 436
No. 9	169,807	189,592	156,613	227,885	1,031	23	189	1,440	+1,251
No. 10	.....	155,638	128,961	219,346	.....	40	4	1,517	+1,513
No. 11	.....	.....	.....	234,471	.....	.....	.....	1,646	.....
Total	1,581,154	1,962,470	1,780,858	2,678,923	11,001	10,887	11,633	17,899	.....

Statement of commerce, in tons, passing the locks on Kentucky River, Kentucky, during the calendar years 1904, 1905, 1906, and 1907.

LOCK NO. 1.

Articles.	1904.	1905.	1906.	1907.
Coal	32,441	67,135	73,217	109,173
Grain	4,093	2,742	5,174	2,275
Salt	464	720	711	619
Oil	308	319	321	245
Whisky	1,348	2,221	1,384	1,276
Flour	1,943	1,584	2,074	2,257
Sugar	292	279	315	263
Molasses	40	56	27	13
Cement	587	400	2,147	372
Tobacco	2,339	3,435	4,163	2,052
Hay	766	428	1,303	810
Live stock	784	670	918	1,037
Lumber and timber	74,552	83,181	80,285	77,075
Shingles	81	74	71	94
Manufactured iron	271	137	490	593
Produce	104	35	68	61
General and miscellaneous	5,871	6,269	11,576	11,287
Total	126,284	169,685	184,244	209,502
Number of passengers	7,592	8,941	12,045	10,904

LOCK NO. 2.

Coal	25,556	58,490	66,095	102,387
Grain	3,650	1,956	4,959	2,151
Salt	230	403	509	362
Oil	210	161	239	149
Whisky	1,404	2,126	1,448	1,278
Flour	1,317	990	1,457	1,399
Sugar	183	140	214	165
Molasses	17	21	6	9
Cement	355	252	225	313
Tobacco	1,575	2,173	2,257	1,017
Hay	626	133	948	283
Live stock	409	385	586	593
Lumber and timber	73,987	79,358	65,140	82,170
Shingles	29	15	36	30
Manufactured iron	215	75	349	310
Produce	55	33	77	22
General and miscellaneous	4,189	4,121	10,154	9,911
Total	114,007	150,832	154,699	202,549
Number of passengers	4,998	6,279	6,239	6,598

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Statement of commerce, in tons, passing the locks on Kentucky River during the calendar years 1904, 1905, 1906, and 1907—Continued.

LOCK NO. 3.

Articles.	1904.	1905.	1906.	1907.
Coal	23,782	56,536	63,484	97,4[illegible]
Grain	3,645	2,011	4,650	1,9[illegible]
Salt	119	124	93	1[illegible]
Oil	125	87	131	[illegible]
Whisky	1,333	2,096	1,403	1,[illegible]
Flour	887	631	971	[illegible]
Sugar	85	53	127	[illegible]
Molasses	13	13	10	[illegible]
Cement	201	173	192	[illegible]
Tobacco	569	1,077	925	[illegible]
Hay	443	32	943	[illegible]
Live stock	290	274	419	[illegible]
Lumber and timber	67,124	71,738	65,013	75,[illegible]
Shingles	10	7	7	[illegible]
Manufactured iron	250	61	235	[illegible]
Produce	50	25	38	[illegible]
General and miscellaneous	2,402	2,357	7,628	7,[illegible]
Total	101,280	137,305	146,269	185,[illegible]
Number of passengers	3,708	5,084	4,114	3,[illegible]

LOCK NO. 4.

Coal	23,850	55,592	62,619	99,[illegible]
Grain	3,361	2,015	4,802	1,[illegible]
Salt	81	115	103	[illegible]
Oil	76	87	96	[illegible]
Whisky	1,173	2,183	1,454	1,[illegible]
Flour	671	565	907	[illegible]
Sugar	71	53	96	[illegible]
Molasses	7	13	7	[illegible]
Cement	188	155	149	[illegible]
Tobacco	229	455	282	[illegible]
Hay	489	20	1,019	[illegible]
Live stock	110	115	211	[illegible]
Lumber and timber	70,229	71,220	65,491	78,[illegible]
Shingles	15	5	6	[illegible]
Manufactured iron	239	24	173	[illegible]
Produce	22	26	32	[illegible]
General and miscellaneous	1,811	1,567	6,373	6,[illegible]
Total	102,122	134,249	143,819	190,[illegible]
Number of passengers	3,931	5,708	4,442	3,974

LOCK NO. 5.

Coal	7,119	15,447	10,830	21,[illegible]
Grain	3,212	1,742	2,956	1,[illegible]
Salt	46	102	106	[illegible]
Oil	36	30	32	[illegible]
Whisky	1,200	2,262	1,374	1,[illegible]
Flour	181	147	247	[illegible]
Sugar	26	10	24	[illegible]
Molasses	2	4	.....	[illegible]
Cement	124	43	42	[illegible]
Tobacco	166	94	186	[illegible]
Hay	291	11	63	[illegible]
Live stock	102	66	125	[illegible]
Lumber and timber	114,105	174,478	118,686	189,[illegible]
Shingles	5	9	4	[illegible]
Manufactured iron	17	8	79	[illegible]
Produce	10	10	5	[illegible]
General and miscellaneous	976	926	1,071	1,[illegible]
Total	127,618	195,389	135,832	215,[illegible]
Number of passengers	3,495	3,317	3,597	2,[illegible]

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Statement of commerce, in tons, passing the locks on Kentucky River during the calendar years 1904, 1905, 1906, and 1907—Continued.

LOCK NO. 6.

Articles.	1904.	1905.	1906.	1907.
Coal	4,439	5,187	5,976	9,670
Grain	3,163	1,667	3,298	1,314
Salt	37	99	98	68
Oil	26	19	22	10
Whisky	598	867	1,049	939
Flour	97	108	136	107
Sugar	17	4	15	14
Molasses	.....	3	.....	2
Cement	92	58	21	324
Tobacco	25	90	118	1
Hay	188	.....	64	11
Live stock	47	58	124	225
Lumber and timber	112,973	192,680	183,509	219,268
Shingles	4	4	4	3
Manufactured iron	27	3	60	113
Produce	7	5	5	3
General and miscellaneous	690	663	681	1,164
Total	122,430	201,510	145,180	233,236
Number of passengers	3,077	6,077	3,670	3,250

LOCK NO. 7.

Coal	3,700	4,065	5,735	3,804
Grain	3,011	1,664	2,885	1,307
Salt	26	66	90	70
Oil	19	18	20	7
Whisky	602	844	979	885
Flour	57	84	112	66
Sugar	11	3	9	2
Molasses	.....	2	.....	1
Cement	69	12	68	318
Tobacco	10	25	80	1
Hay	159	.....	55	10
Live stock	39	69	117	209
Lumber and timber	123,218	187,522	128,286	217,850
Shingles	.....	7	4	1
Manufactured iron	12	3	41	108
General and miscellaneous	1,718	584	678	827
Total	131,651	194,963	139,154	230,461
Number of passengers	2,996	7,805	2,770	2,496

LOCK NO. 8.

Coal	276	683	502	2,729
Grain	199	1	97	27
Salt	12	63	16	42
Oil	10	10	19	6
Whisky	.....	51	52	17
Flour	28	50	69	18
Sugar	4	.....	16	1
Cement	69	7	36	286
Tobacco	.....	23	64	1
Hay	20	1	2	2
Live stock	24	38	97	126
Lumber and timber	148,307	177,488	127,630	219,542
Shingles	.....	9	1	1
Manufactured iron	11	3	19	106
Produce	.....	.....	2	1
General and miscellaneous	429	429	330	483
Total	149,389	178,856	128,952	223,389
Number of passengers	2,779	4,457	2,254	2,355

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***Statement of commerce, in tons, passing the locks on Kentucky River during the calendar years 1904, 1905, 1906, and 1907*—Continued.**

LOCK NO. 9.

Articles.	1904.	1905.	1906.	1907.
Coal	151	.....	42	1,6
Grain	.....	.....	.....	
Salt	.....	.....	.....	
Cement	.....	.....	.....	
Live stock	2	.....	.....	
Lumber and timber	148,737	184,135	140,327	208,
Manufactured iron	7	.....	.....	
General and miscellaneous	339	302	.....	
Total	149,236	184,437	140,369	205,
Number of passengers	1,448	18	30	1,

LOCK NO. 10.

Coal	.....	.....	.....	
Cement	.....	.....	.....	
Lumber and timber	.....	153,099	121,188	178,
Manufactured iron	.....	.....	.....	
General and miscellaneous	.....	330	.....	
Total	.....	153,429	121,188	180,
Number of passengers	.....	1	.....	

LOCK NO. 11.

Coal	.....	.....	.....	1,
Cement	.....	.....	.....	
Lumber and timber	.....	.....	.....	219,
Manufactured iron	.....	.....	.....	
General and miscellaneous	.....	.....	.....	
Total	.....	.....	.....	220,
Number of passengers	.....	.....	.....	

Tons of commerce.

Locks—	1904.	1905.	1906.	1907.
No. 1	126,284	169,685	184,344	208,
No. 2	114,007	150,832	154,699	202,
No. 3	101,280	137,205	146,269	185,
No. 4	102,122	134,249	143,319	190,
No. 5	127,618	195,389	135,332	215,
No. 6	122,430	201,510	145,180	223,
No. 7	131,651	194,963	139,154	220,
No. 8	149,389	178,856	128,592	223,
No. 9	149,236	184,437	140,369	205,
No. 10	.....	153,429	121,188	180,
No. 11	.....	.....	.....	220,

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List of boats plying Kentucky River, Kentucky, during calendar year ending December 31, 1907.

Name of boat.	Character.	Length.	Breadth.	Depth.	Tonnage.
		Feet.	*Feet.*	*Feet.*	
General O. M. Poe	U. S. towboat	145.00	34.0	4.6	150.00
Pearl	U. S. launch	40.00	8.0	4.0	8.00
Falls City	Packet	151.67	36.0	4.4	235.00
Donca	....do	110.00	19.0	3.5	59.00
Reba Reeves	....do	105.40	21.8	3.4	68.00
White Dove	....do	65.00	14.0	3.0	35.00
Mountain State	Towboat	143.70	28.0	3.5	142.00
Major Slack	....do	143.00	26.1	4.5	98.00
S. P. Gillett	....do	134.00	28.0	4.5	96.00
Geo. Matherson No. 2	....do	130.10	25.0	4.0	121.00
Sea Lion	....do	120.00	21.0	3.5	106.00
R. J. Armstrong	....do	104.00	22.0	3.5	154.00
Darling	....do	102.00	22.3	4.0	78.10
Nellie England	....do	90.00	18.0	3.0	82.00
Dixie	....do	86.00	16.0	3.0	35.00
Mabel	....do	80.00	17.0	3.5	49.00
Alys Gray	....do	73.00	12.8	3.0	32.00
Orpha	....do	70.00	6.5	3.0	32.00
Nettie Grant	....do	69.00	12.0	3.0	20.00
Blue Wing	....do	62.00	11.0	1.5	40.00
John A	....do	61.80	11.0	3.0	18.00
Marguerite	....do	59.00	10.0	2.0	18.00
Lucile	....do	55.00	12.0	2.0	14.00
Georgie	....do	55.00	11.0	2.4	15.00
Fannie	....do	55.00	11.0	2.4	10.00
Willie B	....do	50.00	10.0	2.5	10.00
Dove	....do	47.00	8.0	1.5	18.00
Basil	....do	45.00	9.0	1.5	7.00
Amy	....do	36.00	7.0	1.8	3.00
Champion	Sawmill boat	80.00	26.0	4.5	69.00
Tecumseh	Pleasure boat	80.50	18.0	3.5	36.00
Shamrock	....do	56.00	10.0	3.0	9.00
Alice	....do	56.00	12.0	2.0	7.00
Ollie	....do	54.00	11.8	3.0	34.00
Ellene	....do	50.00	12.0	3.5	9.00
Charter	....do	50.00	12.0	2.0	13.00
Rambler	....do	40.60	9.0	5.0	10.00
S. & F. Sawyer	....do	40.00	11.0	2.0	9.00
Outing	....do	40.00	9.5	2.5	9.00
Williamette	....do	40.00	8.0	3.8	10.00
Relsome	....do	40.00	7.0	2.5	6.00
The Scout	....do	39.00	7.6	2.5	4.00
Marjorie	....do	38.00	7.9	5.0	3.00
Itaky	....do	37.50	9.5	3.0	4.00
Rescue	....do	35.00	8.0	4.0	3.00
Clelette	....do	35.00	8.0	4.0	3.00
Pomona	....do	35.00	8.0	4.0	3.00
Olney	....do	35.00	8.0	2.5	5.00
Vevay	....do	35.00	7.0	4.0	3.00
Raymond	....do	35.00	7.0	4.0	3.00
Francis	....do	33.00	7.0	4.6	2.50
Ina	....do	33.00	7.0	4.2	4.00
Merry Houston	....do	32.00	8.0	4.6	4.00
Eufaula	....do	32.00	7.0	3.5	1.50
Helen	....do	32.00	7.0	2.5	3.00
Water Adder	....do	32.00	6.0	2.0	3.00
Ida	....do	30.00	8.0	3.5	2.00
Drennon Springs	....do	30.00	7.0	5.0	2.00
Katherine	....do	30.00	7.0	3.5	1.00
Ruth	....do	30.00	6.0	3.0	2.50
Hot Foot	....do	28.00	6.0	1.8	1.50
Margaret	....do	27.00	7.0	4.0	2.00
Iva B	....do	27.00	5.4	2.5	3.00
Harry	....do	27.00	4.3	4.0	2.00
Eagle	....do	26.00	7.6	2.0	3.00
Big Four	....do	26.00	5.5	3.5	3.00
Wild Wood	....do	26.00	5.0	3.5	2.50
Corona	....do	25.00	6.6	4.0	4.00
Norma	....do	25.00	6.0	2.5	2.00
Old Cro	....do	25.00	5.6	4.4	2.00
Esther	....do	25.00	5.5	3.0	2.00
Alva	....do	25.00	5.5	3.0	2.00
High Ball	....do	25.00	5.0	3.0	2.00
Kentucky Belle	....do	22.50	6.0	2.5	2.00
Enid	....do	22.50	5.5	4.0	3.00
Red Blossom	....do	22.50	4.1	2.2	1.00
Ormada	....do	22.50	4.0	3.0	1.00
Adele Maria	....do	22.00	6.0	3.0	1.50
Shamrock	....do	22.00	5.8	2.0	1.00
L. W. Wood	....do	22.00	5.0	2.2	2.00

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List of boats plying Kentucky River, Kentucky, during calendar year ending December 31, 1907—Continued.

Name of boat.	Character.	Length.	Breadth.	Depth.	Tonnage.
		Feet.	*Feet.*	*Feet.*	
Wilma	Pleasure boat	22.00	5.0	2.0	1.00
Sir Huon	do	22.00	4.8	3.5	1.00
Fox	do	22.00	4.4	2.5	1.00
Judge	do	22.00	4.0	3.0	1.00
Sis	do	21.00	5.0	3.5	1.50
Raymond	do	21.00	4.8	2.5	1.50
So Long	do	20.00	4.6	2.5	1.00
Launch No. 151	do	19.00	5.0	1.1	1.00
Ranger	do	18.20	4.0	2.4	1.00
Hudson	do	18.20	3.5	2.4	1.00
Wignotte	do	18.00	4.8	3.0	1.50
Luella	do	18.00	4.6	1.9	1.50
Launch No. 6	do	18.00	4.6	1.1	1.00
Fox	do	18.00	4.0	2.0	1.00
Nymph	do	16.00	5.0	1.2	.50
Owana	do	16.00	4.2	2.5	1.00
Spray	do	16.00	4.2	2.0	1.00
Pocahontas No. 3	do				
Jas. A. Doyle	do				
Igo	do				
Uncle Jim	do				
Georgia	do				
Dorothy	do				
Alma	do				
Sprite	do				
Mary H	do				
Little Joe	do				
Little Abe	do				
Monaia	do				
Lucy	do				
Effie	do				
Wellington No. 2	do				
Virginia	do				
Essawan	do				
Anetta	do				
J. M. Thomas	do				
Lydia Belle	do				
Wickliff	do				
Emma T	do				
Mary Ellen	do				
Mountain Rat	do				
Edna	do				
Mollie	do				
Gertrude	do				
H. Henry	do				
City of Frankfort	do				
Caroline	do				
Maple Leaf	do				
Ellen T	do				
Nannie M	do				
Aida	do				
Belle	do				
Flora	do				
Charter No. 2	do				
John L	do				
Dean	do				
Olsca	do				
Ramona	do				
Thelma	do				
Hester	do				

NOTE.—Where no dimensions are given the boats are small gasoline launches.

List of leases in force during the fiscal year ending June 30, 1908, Kentucky River, Kentucky.

Location	Lock No. 4.
Lessee	Kentucky River Mills.
Date	July 10, 1878.
Expires	July 10, 1977.
Annual rental	$180 per year.

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APPENDIX I L.

IMPROVEMENT OF RIVERS AND HARBORS IN THE LOUISVILLE, KENTUCKY, DISTRICT.

REPORT OF CAPT. H. BURGESS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Falls of Ohio River at Louisville, Kentucky.
2. Operating and care of Louisville and Portland Canal, Kentucky.
3. Wabash River, Indiana and Illinois.
4. Operating and care of lock and dam at Grand Rapids, Wabash River.
5. White River, Indiana.
6. Green River, above the mouth of Big Barren River, Kentucky.
7. Operating and care of locks and dams on Green and Barren rivers, Kentucky.
8. Rough River, Kentucky.
9. Operating and care of lock and dam on Rough River, Kentucky.

UNITED STATES ENGINEER OFFICE,
Louisville, Ky., July 10, 1908.

SIR: I have the honor to transmit herewith annual reports of the works under my charge at the close of the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

H. BURGESS,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

I I 1.

IMPROVEMENT OF FALLS OF OHIO RIVER AT LOUISVILLE, KENTUCKY.

A condensed description of the original condition, outline of projects, etc., will be found on page 612 of this report; references to more detailed information may be found on page 488, Annual Report of the Chief of Engineers for 1904.

NEW SECTIONS OF DAM.

During the past fiscal year the steel and iron work for the additional sections of Boulé dam and the 648 feet of Chanoine dam, the latter for Indiana Chute, was delivered, inspected, and stored. The work of preparing wickets for the several parts of the dam was continued at the canal shops, and all of those for the Chanoine section and about 80 per cent of those for the Boulé sections were completed.

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In the work of erecting the new dam in place the completion of only those sections (2 and 3) of Boulé dam at the head of the north canal wall, opposite Ninth street, Louisville, Ky., was practicable, and even this was accomplished only after several delays and much interference from rises in the river. In fact, the river was at a practically continuously unfavorable stage of water during the entire period of construction, which necessitated expensive additions to and constant care of the temporary protection dam, and was the cause of much expense incident to the numerous discontinuances and resumptions of work. The estimated cost of this work was $31,000, while the actual cost was $42,314.08. These sections of the dam aggregate in length 650 feet with crest elevation of +12.7 feet, upper canal gauge (415.704 feet above sea level). The views herewith illustrate the type of temporary dam used, the foundation and sills, and the trestles when raised and lowered.

On August 10, 1907, with the gauge reading 4.3 feet and the expectation that a favorable stage of water would soon prevail, the work of raising the old section of Boulé dam in Middle Chute was begun preparatory to the construction of the temporary dam between that chute and Indiana Chute, necessary for the construction of foundation and erecting sections 5 and 6 of the new dam. The old dam, 500 feet long, was raised, 580 feet of service track, except the rails, and 65 feet of temporary dam were completed by August 27, when a rising river caused a temporary suspension of the work and the removal of the service track. As soon as practicable the work of placing cribs for the temporary dam was resumed. High water again caused a suspension of the work from September 13 to 19, and on September 29 another rise washed out 80 feet of the temporary structure. On October 12 still another rise in the river again necessitated a suspension of work. On October 16, on account of the lateness of the season and prevailing high water, it was decided to abandon further effort toward completing the dam during that season; accordingly all material and plant were removed from the site and operations suspended.

It is a matter of extreme regret and annoyance that, with all of the material for the 2,148 feet of new movable dam on hand and with ample funds for doing the work, the water conditions during the past three years have been so abnormal as to preclude the setting up in place of any of it, except sections 2 and 3, which are located more favorably for work at higher stages. On account of the swiftness of the current and the exposed site of the dam, the remainder of the work can be done reasonably economically only when the stage of the water is not greater than 4 feet, upper gauge. During past years this stage, or lower, has been reached as follows:

	Days.
1885. July 13 to 23, October 1 to 18	29
1886. September 7 to 23, October 12 to November 18	55
1887. July 6 to December 17, December 27 to 31	170
1888. June 24 to 27, August 7 to 17	15
1889. September 9 to 17	7
1890. August 4 to 10	7
1891. September 24 to November 18	56
1892. August 22 to November 18	89
1893. July 17 to September 5, September 14 to 19, September 24 to October 5, November 26 and 27	71

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	Days.
1894. July 9 to September 27, October 5 to November 17, December 3 to 8	130
1895. February 15 to 20, June 11, July 7, July 14 and 15, August 7 to 25, August 29 to December 4, December 19 to 25	159
1896. September 7 to 19	13
1897. August 20 and 21, September 2 to November 7, November 14 to 16	72
1898. July 15 to 20, September 18 to 29, October 4 to 9	24
1899. July 14 to 23, August 22 to September 22, November 17 to 24, December 8 to 11	54
1900. August 12 to 26, September 4 to October 29, November 2 to 21	89
1901. August 2 to 11, October 12 to November 24	54
1902. August 25 to October 5, October 29 to November 19	64
1903. August 14 to September 3, September 15 to 20, September 30 to October 16, October 23 to November 22, December 6 to 22	92
1904. July 28 to December 31	157
1905. September 11 to 18, October 2 to 19	26
1906. May 28 to June 3, July 5 to 21, September 17 to 29, November 13 to 19	42
1907. October 29 to November 2	5
1908. (To June 30)	0

This table shows that the last three years have been the most unfavorable for work since 1898. The accompanying views[a] plainly show the difficulties encountered during the attempts to do this work during the past three seasons, and show the impracticability of its being done without an expenditure for temporary breakwaters and cofferdams much beyond what is available. Had funds been available in 1904 the entire work could have been done that year at a cost considerably below that estimated.

On June 16, 1908, the river reached a stage sufficiently low to begin preparations for a resumption of operations; accordingly the old dam in section 5 was raised, and the transfer of material to the site of the work and the construction of service track and temporary dam begun. At the close of the year 43 of the temporary cribs, each 16 feet long, had been placed in position, sheathed, and weighted with 86 cubic yards stone, and 528 feet of service track had been built. Drilling for the foundation of the new dam was begun on June 30, 1908.

The boiler, engine, cable, carriage, and lumber for cableway towers were received and transferred to the Indiana side of the river; the lumber framed, the foundation for the 85-foot tower commenced, and a temporary shed for cement, etc., built.

The land for the abutment on the Indiana shore has not been secured. After much delay in the examination of title it has been decided that the parcels desired must be procured through condemnation proceedings, and these have been instituted. However, unless there is unreasonable delay in obtaining this ground, no delay to the construction of the dam proper will be experienced if other conditions become favorable, as the construction of the abutment can be done at some later date without much additional inconvenience.

REMOVAL OF ROCK.

The area of solid rock remaining within the limits of the enlargement at the head of the Louisville and Portland Canal at the close of last fiscal year has been drilled and blasted, and the canal dredges, when they could be spared from the work of removing deposit of

[a] Not printed.

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mud from the canal, were engaged in removing disrupted rock; the work accomplished is summarized as follows:

	Cubic yards.
Solid rock disrupted	6,851.19
Disrupted rock removed	10,999.55

The quantity of disrupted rock remaining to be removed amounts to 13,962.55 cubic yards.

Money statement.

July 1, 1907, balance unexpended	$348,483.09
June 30, 1908, amount expended during fiscal year for works of improvement	136,810.87
July 1, 1908, balance unexpended	211,672.22
July 1, 1908, outstanding liabilities	321.10
July 1, 1908, balance available	211,351.12
Amount (estimated) required for completion of existing project	429,215.99

APPROPRIATIONS.

Enlargement at head of canal and of basin at lock:		
July 5, 1884	$300,000.00	
August 5, 1886	150,000.00	
August 11, 1888	150,000.00	
September 19, 1890	60,000.00	
July 13, 1892	60,000.00	
August 18, 1894	60,000.00	
		$780,000.00
Allotments for Indiana Chute from appropriations for improving Ohio River:		
July 14, 1880	$10,000.00	
March 3, 1881	50,000.00	
August 2, 1882	35,000.00	
July 5, 1884	10,000.00	
August 5, 1886	20,000.00	
August 11, 1888	15,000.00	
		140,000.00
Appropriations for work on Indiana Chute:		
September 19, 1890	$25,000.00	
July 13, 1892	35,000.00	
August 18, 1894	20,000.00	
		80,000.00
Net allotment from appropriation for maintenance of river and harbor improvements, act of April 28, 1904		14,545.06
Net allotment from appropriation for improving Ohio River, general improvement, act of March 3, 1905		5,353.80
Appropriations for improving Falls of Ohio River and Indiana Chute, Falls of Ohio River:		
June 3, 1896	$10,000.00	
June 4, 1897	350,000.00	
July 1, 1898	152,250.00	
March 3, 1899	15,000.00	
June 13, 1902	41,000.00	
March 3, 1905	80,000.00	
March 2, 1907	314,000.00	
		962,250.00
October 17, 1906, sale of property		350.00
Total		1,982,498.86

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II 2.

OPERATING AND CARE OF LOUISVILLE AND PORTLAND CANAL, KENTUCKY.

Description of original condition and references to former reports, documents, etc., will be found on page 491, Annual Report of the Chief of Engineers for 1904.

The project and estimate for the fiscal year ending June 30, 1908, approved July 18, 1907, provided as follows:

It is proposed to operate the canal and locks and to make such repairs as may from time to time become necessary to maintain them in good navigable condition; to operate the dredging outfit as needed in clearing the canal and locks of deposit brought into them by high water; to make such repairs to the towboat, dredges, buildings, walls, slopes, pavements, roadways, bridges, fences, and other Government property, as are necessary to maintain them in good condition; to complete the construction of the south canal wall and revetment above the canal basin at the Byrne & Speed Coal Company's elevator; to purchase or construct two center dump scows, and to purchase two steel barges.

The estimate for the year is summarized as follows:

Regular force	$56,404.00
Repairs	11,500.00
Completing south canal wall	8,861.58
Steel barges	15,000.00
Dump scows	9,500.00
Miscellaneous, supplies, and contingencies	12,000.00
Total	113,265.58

Under the foregoing project and estimate, the operations during the fiscal year, in addition to the usual work of passing traffic, operating the movable dams, and ordinary current repairs incident to care and preservation, were as follows:

Dredging.—The dredging plant removed the following:

	Cubic yards.
Mud and rock from canal	300,418
Mud and rock from in front of new south wall	9,635
Mud from in front of city wharf	28,125
Mud from basin used by Byrne & Speed Coal Company	4,500
Mud from O'Neil Coal and Coke Company's landing	2,300
Total	344,978

The expense of dredging in front of the city wharf was borne by the city of Louisville, Ky., that in the basin by the Byrne & Speed Coal Company, and that at the landing by the O'Neil Coal and Coke Company.

Expenditures from the item "Regular force" in the allotment amounted to $44,527.98.

Repairs.—Towboat *Cherokee* was placed on dry dock July 31 and December 14, 1907, and repairs made to her hull, rudders, etc. During the year minor repairs were made to machinery, decking, fantail, wheel, etc., and a new searchlight installed.

The hull, decking, capstan, wheel, roof, etc., of the towboat *Shawnee* were repaired, the old breeching replaced with new, the machinery overhauled, and the outside of the boat painted.

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The flues of the small towboat *Wave Rock* were renewed, boiler and smokestack painted, and machinery repaired. The furnace, hull, and machinery of the small towboat *Willow Point* were also repaired.

The dredges *Louisville*, *Casey*, and *Wabash* were repaired from time to time, as became necessary to keep them in good serviceable condition. The scows, barges, and other floating plant, the buildings, roadways, bridges, slopes, fences, shop and lock machinery were repaired or repainted as became necessary. The expenditures for these repairs amounted to $13,222.50.

Completing south canal wall.—The work remaining to be done at the close of last fiscal year was completed. This remaining work consisted of completing the pavement, drilling and disrupting rock ledge, and removing old guard gate masonry. Following is a summary of work done to June 30, 1908:

Earth removed from ledge	cubic yards	12,882.47
Rock disrupted	do	6,303.4
Masonry, cut stone	do	1,339.87
Masonry, backing stone	do	2,348.33
Masonry, concrete	do	66.95
Masonry, rubble foundation	do	18.39
Disrupted rock placed north of north canal wall	do	541.00
Face stone, cut for use in wall	do	7.8
Curbing, drilled and placed around slope paving	linear feet	475.00
Old stone dressed	cubic yards	22.00
Mud and rock removed from in front of wall, etc	do	11,985.6
Old wall and guard-gate masonry removed	do	1,289.34
Paving placed on slope	square yards	1,604.9
Concrete coping	cubic yards	95.56
Earth excavated from slope	do	914.9
Earth placed on slope for pavement	do	156.2
Loose rock, in drain on slope	do	38.5

Total cost to June 30, 1908, $50,197.41.

Two new steel barges.—These barges are 90 feet 11½ inches long, 24 feet 6⅜ inches wide, and 6 feet 3 inches deep at the gunwales, and are being built under the contract outlined below. They were very nearly completed at the close of the fiscal year. Expenditures to date amount to $34.39.

Two new dump scows.—These are to be built of wood. It had been intended to have them built under contract, but advertisement did not secure any satisfactory bids, and steps were taken to procure the material and build the scows by hired labor. Part of the material has been received and it is expected to complete the scows during the present season.

Expenditures to date amount to $261.90.

Miscellaneous, supplies, and contingencies.—Expenditures under this heading were for necessary supplies for use in shops, on dredges and towboats, and for fuel for boats, locks, shops, etc., and amounted to $10,498.29.

Dry dock.—During the year the dry dock was used by private boats twenty-nine days and nineteen hours, for which $323.31 was collected and deposited to the credit of the Treasurer of the United States. It was used for docking 21 Government boats one hundred and thirty-eight days and sixteen hours.

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Summary of expenditures on account of operating and care of Louisville and Portland Canal, fiscal year 1908, showing general items and amount expended under each heading.

Item.	Amount.
Services	$81,152.56
Supplies	6,415.34
Materials	14,728.14
Miscellaneous	817.59
Total	103,114.15

Collections.

1907.		
July 22.	Auction sale of condemned property	$406.75
Aug. 1.	W. F. Nugent & Bros., use of dry dock	45.42
Aug. 12.	N. N. Pryor, use of dry dock	29.58
Sept. 28.	Speed Elevator Company, rent of land	125.00
Oct. 19.	Ohio River Sand Company, use of dry dock	196.66
Nov. 22.	Charles F. Taylor, receiver, use of dry dock	36.67
Nov. 22.	Byrne & Speed Coal Company, use of dredging plant	116.25
Dec. 16.	O'Donnell & Co., rent of land	50.00
Dec. 16.	O'Neil Coal and Coke Company, use of dredging plant	129.38
1908.		
Jan. 8.	Louisville Cement Company, rent of land	30.00
Jan. 8.	Union Cement and Lime Company, rent of land	5.00
Feb. 28.	Charles F. Taylor, receiver, use of dry dock	15.00
Mar. 25.	Speed Elevator Company, rent of land	125.00
May 23.	Byrne & Speed Coal Company, use of dredging plant	120.00
	Total	1,430.71

All of the above collections were deposited to the credit of the Treasurer of the United States.

APPROPRIATIONS AND ALLOTMENTS.

APPROPRIATIONS.

Act of March 3, 1881	$40,562.91

ALLOTMENTS.

[From act of March 3, 1881.]

Fiscal year 1882	$54,105.66	Fiscal year 1884	$53,189.18
Fiscal year 1883	61,333.14	Fiscal year 1885	4,872.02

[From act of July 5, 1884.]

——, 1884	$67,496.56	July 23, 1897	$67,811.47
August 3, 1885	91,840.00	July 15, 1898	62,061.71
July 28, 1886	82,320.00	July 19, 1899	78,422.89
July 2, 1887	77,805.00	July 18, 1900	78,590.05
July 13, 1888	99,456.79	July 17, 1901	108,550.20
July 20, 1889	93,744.00	July 30, 1902	118,732.34
July 19, 1890	55,548.88	July 24, 1903	43,484.66
July 17, 1891	78,769.38	July 15, 1904	92,385.46
July 20, 1892	102,175.94	July 20, 1905	76,748.41
July 13, 1893	77,158.68	September 9, 1905	25,000.00
September 9, 1893	2,000.00	March 10, 1906	10,200.00
July 11, 1894	114,528.08	July 13, 1906	108,567.53
November 27, 1894	1,500.00	July 18, 1907	102,645.79
July 11, 1895	112,838.28		
July 28, 1896	123,715.05	Total	2,367,680.06

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CONTRACT IN FORCE.

Contractor: American Bridge Company, of New York.
Date of contract: November 7, 1907.
Date of approval of contract: January 8, 1908.
Date of notification of approval of contract: January 17, 1908.
Date of completion of contract: On or before the expiration of thirty-four weeks from date of notification of approval of contract.
For two steel barges, built and delivered in accordance with the specifications: Price, $7,050 for each barge.
Liquidated damages in case of failure to deliver within stipulated time: $ per day for each barge each day.

COMMERCIAL STATISTICS.

Statements of traffic and commerce through the Louisville and Portland Canal and through the open river channel over the falls of the Ohio River at Louisville, Ky., from July 1, 1907, to June 30, 1908.

TRAFFIC.

Kind of craft.	Via canal.		Via open river channel.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Passenger boats	338	126,100	156	60,868	494	186,9
Towboats	875	97,690	556	81,863	1,431	179,5
Government boats	173	16,386	15	1,410	188	17,7
Coal barges	2,746	833,498	988	324,813	3,734	1,158,3
Other barges	560	115,511	199	57,154	759	172,6
Small craft	376	716	10	57	386	7
Rafts	1				1	
Total	5,069	1,189,901	1,924	526,165	6,993	1,716,8
Lockages, fiscal year	1,994					

COMMERCE.

Articles.	Via canal.	Via open river channel.	Total.
	Tons.	*Tons.*	*Tons.*
Coal	1,044,201½	475,226	1,519,4
Corn	624½	154	7
Wheat	1,462½	114½	1,5
Salt	9,802½	433½	10,2
Oil	570	344½	9
Whisky	1,867½	591½	2,4
Flour	272	81½	3
Sugar	269½	231	5
Molasses	626½	2,323	2,9
Cement	467	208½	6
Tobacco	3,640½	249	3,8
Cotton	222½	113½	3
Hay	3,662½	1,258½	4,9
Straw	1,779	453½	2,2
Cattle	1,069½	290½	1,3
Swine and sheep	1,864½	591½	2,4
Horses and mules	151½	100½	2
Lumber	25,631	4,565½	30,1
Staves	3,437½		3,4
Steel rails	15		1
Manufactured iron	18,949	27,357	46,3
Brick		1,060	1,0
Produce	469½	12½	4
Miscellaneous	50,185½	29,374½	79,5
Total	1,171,240	545,221½	1,716,4
Passengers.....number..	11,770	4,897	16,6

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Comparative statement of traffic and commerce, Louisville, Ky.

TRAFFIC.

Fiscal year.	Via Louisville and Portland Canal.					Via open river.					Aggregate.
	Passenger boats.	Towboats.	Coal boats and barges.	Miscellaneous.	Total.	Passenger boats.	Towboats.	Coal boats and barges.	Miscellaneous.	Total.	
	No.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
1895	637	513	2,121	353	3,624	101	227	577	3	908	4,532
1896	635	771	2,975	184	4,565	128	274	641	2	1,045	5,610
1897	649	746	2,483	279	4,157	310	823	1,374	33	2,540	6,697
1898	595	883	2,847	265	4,590	175	435	838	67	1,515	6,105
1899	584	859	2,783	354	4,580	230	659	1,432	148	2,469	7,049
1900	681	988	3,276	328	5,273	94	204	356	85	739	6,012
1901	611	949	3,255	213	5,028	175	619	1,610	188	2,592	7,620
1902	627	770	2,387	430	4,214	134	470	971	124	1,699	5,913
1903	503	870	3,054	285	4,712	202	788	1,539	64	2,593	7,305
1904	518	900	3,456	645	5,519	89	481	926	21	1,517	7,036
1905	410	894	2,673	750	4,727	88	377	804	213	1,482	6,209
1906	501	1,055	3,599	666	5,821	82	269	597	121	1,069	6,890
1907	415	880	3,446	601	5,342	148	452	915	30	1,545	6,887
1908	338	1,048	3,406	377	5,069	156	571	1,187	10	1,924	6,993

COMMERCE.

Fiscal year.	Via Louisville and Portland Canal.			Via open river.			Aggregate.
	Coal.	Other freight.	Total.	Coal.	Other freight.	Total.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1895	564,281	162,776	727,057	383,015	20,572	402,587	1,129,644
1896	989,957	285,766	1,275,723	390,260	35,954	426,214	1,701,937
1897	807,441	264,873	1,072,314	730,571	84,549	815,120	1,887,434
1898	859,411	289,353	1,148,764	516,728	53,226	569,954	1,718,718
1899	735,479	251,653	987,132	765,758	95,155	860,923	1,848,055
1900	1,008,524	273,274	1,281,798	274,215	18,181	292,396	1,574,194
1901	863,047	264,540	1,127,587	904,239	94,949	999,188	2,126,775
1902	496,278	351,344	847,622	530,555	95,424	625,979	1,473,601
1903	754,306	230,026	984,332	939,856	108,269	1,048,125	2,032,457
1904	1,413,063	144,328	1,557,391	498,808	43,119	541,927	2,099,318
1905	594,169	138,438	732,607	479,434	30,209	509,643	1,242,250
1906	867,514	186,012	1,053,526	352,005	31,143	383,148	1,436,674
1907	953,187	126,347½	1,079,534½	401,474	52,318	453,792	1,533,326½
1908	1,044,201½	127,038½	1,171,240	475,236	69,985½	545,221½	1,716,461½

II 3.

IMPROVEMENT OF WABASH RIVER, INDIANA AND ILLINOIS.

Description of original condition, projects, object, and scope of improvement, etc., relating to the two divisions of the river will be found in Annual Reports of the Chief of Engineers for fiscal years as follows: 1886, page 2239; 1898, page 1870; 1902, page 1894. A condensed description and further references will be found at page 618 of this report.

BELOW VINCENNES.

No work was in progress during the past fiscal year, the funds being practically exhausted.

The amount carried in the money statement as required for completion of project is the present estimated cost of closing the cut-off at New Harmony, Ind. The entire amount for this work should be made available from one appropriation, as it will not be advisable

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to begin the work until the amount sufficient for completion is available. Should that amount be appropriated, there should also be made an annual appropriation for keeping the river clear of snags, $15,000 for the first year and $10,000 for each year thereafter. It is believed that closing the cut-off and keeping the channel clear of snags will make possible light-draft navigation from the mouth to Vincennes for practically the entire year. At present there is no through navigation the greater part of the year.

Money statement.

July 1, 1907, balance unexpended	$42.80
June 30, 1908, amount covered into the surplus fund of the Treasury	.26
July 1, 1908, balance unexpended	42.54
July 1, 1908, outstanding liabilities	25.75
July 1, 1908, balance available	16.79
Amount (estimated) required for completion of existing project	75,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$75,000.00
For maintenance of improvement	15,000.00
	90,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

June 10, 1872	$50,000	August 5, 1886	$60,000
March 3, 1873	50,000	August 11, 1888	60,000
June 23, 1874	25,000	September 19, 1890	60,000
March 3, 1875	40,000	July 13, 1892	60,000
August 14, 1876	70,000	August 18, 1894	15,000
June 18, 1878	50,000	June 3, 1896	15,000
March 3, 1879	20,000	March 3, 1899	15,000
June 14, 1880	25,000	June 13, 1902	5,000
March 3, 1881	25,000		
August 2, 1882	40,000	Total	715,000
July 5, 1884	30,000		

ABOVE VINCENNES.

No work was in progress on this section of the river during the year, the balance available being too small to permit of any advantageous operations.

Money statement.

July 1, 1907, balance unexpended	$245.13
July 1, 1908, balance unexpended	245.13

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APPROPRIATIONS.

March 3, 1881	$25,000	August 18, 1894	$5,000
August 2, 1882	30,000	June 3, 1896	6,000
July 5, 1884	10,000	March 3, 1899	4,000
August 11, 1888	5,000		
September 19, 1890	5,500	Total	95,500
July 13, 1892	5,000		

I I 4.

OPERATING AND CARE OF LOCK AND DAM AT GRAND RAPIDS, WABASH RIVER.

The project and estimate for the operation and care of this lock and its appurtenant structures during the fiscal year ending June 30, 1908, contained the following items:

Regular force	$1,200
Repairs	1,000
Miscellaneous	700
Total	2,900

Expenditures during the year were for the payment of the lock tender, ordinary current repairs to the buildings, fences, walkways, etc.

On February 12, 1901, an act entitled "An act authorizing the Mount Carmel Development Company to draw water from Wabash River, at Grand Rapids, Wabash County, Illinois," became a law. This act does not limit the quantity of water to be used by the development company, except that it "shall not be so great as to be detrimental to the navigation of the said Wabash River," nor does it provide for any payment for the privilege. On account of the uncertainty as to what quantity of water might be required by the development company, consideration can not be given to applications from other parties for the use of water power at this dam.

In view of the foregoing and the further fact that no apparent steps have been taken by the development company to avail themselves of the privilege conferred by the act, it is earnestly recommended that this law be repealed and an act substituted containing provisions similar to those governing the use of water power at the dams in Green and Barren rivers, Kentucky, which provisions are as follows:

The Secretary of War is hereby authorized and empowered to grant leases or licenses for the use of the water powers on the Green and Barren rivers, at such a rate and on such conditions and for such periods of time as may seem to him just, equitable, and expedient, said leases not to exceed the period of twenty years: *Provided*, That the leases or licenses shall be limited to the use of the surplus water not required for navigation. And he is also empowered to grant leases or licenses for the occupation of such lands belonging to the United States on said Green and Barren rivers as may be required for mill sites or for other purposes not inconsistent with the requirements of navigation, said leases or licenses not to extend beyond the period of twenty years; and all moneys received under such leases or licenses shall be turned into the Treasury of the United States, and the itemized statement thereof shall accompany the Annual Report of the Chief of Engineers. But nothing in this act shall be construed to affect any vested right, if such there be, of any lessee of water power on said river.

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Summary of expenditures on account of operating and care of lock and dam at Grand Rapids, Wabash River, during the fiscal year 1908, showing general items and amounts expended under each heading.

Item.	Amount.
Services	$745.88
Supplies	19.04
Materials	132.25
Miscellaneous	219.88
Total	1,117.00

ALLOTMENTS.

March 12, 1897	$240.00	July 20, 1903	$326.89
July 23, 1897	1,703.25	July 15, 1904	2,711.06
July 15, 1898	1,451.35	July 17, 1905	172.14
July 21, 1899	9,346.16	July 16, 1906	2,692.25
July 17, 1900	7,752.52	July 12, 1907	1,361.56
July 10, 1901	5,184.34		
July 29, 1902	1,311.38	Total	34,252.90

COMMERCIAL STATISTICS.

Statement of traffic and commerce passing the lock at Grand Rapids, Wabash River, for the fiscal year ending June 30, 1908.

TRAFFIC.

Kind of boat.	Number.	Tonnage.
Passenger	204	881
Tow	334	8,159
Government		
Barges	280	23,950
Small craft	871	2,275
Rafts	8	
Total	1,697	39,225

Total number of lockages during the year is 847.

COMMERCE.

Article.	Quantity.
	Tons.
Coal	5
Corn	783½
Wheat	119½
Shells	1,373½
Lumber	1,907
Timber	648½
Miscellaneous	271½
Total	5,158½

Passengers, 506.

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Comparative statement of traffic and commerce at lock at Grand Rapids, Wabash River.

Fiscal year.	Traffic.					Commerce.
	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.	
	No.	*No.*	*No.*	*No.*	*No.*	*Tons.*
1897	60	80	27	130	297	3,749
1898	46	76	31	199	352	2,374
1899	45	58	32	118	248	2,417
1900	49	58	36	100	238	6,419
1901	62	68	25	112	267	2,364
1902	48	45	14	171	278	2,448
1903	91	82	10	114	297	2,747
1904	139	53	38	249	479	4,370
1905	220	90	45	1,042	1,397	8,025
1906	514	265	13	1,346	2,138	3,990½
1907	576	197	28	1,085	1,886	6,600½
1908	588	280	8	871	1,697	5,155½

II 5.

IMPROVEMENT OF WHITE RIVER, INDIANA.

No operations under the existing project for the improvement of this river were in progress during the past fiscal year, the funds under the approved estimate being almost exhausted.

Full report of project, original condition, scope of improvement, etc., will be found in Annual Report of the Chief of Engineers for the fiscal year 1896, page 2244.

Money statement.

July 1, 1907, balance unexpended	$703.82
July 1, 1908, balance unexpended	703.82

APPROPRIATIONS.

March 3, 1879	$25,000	August 11, 1888	$5,000
June 4, 1880	20,000	July 13, 1892	5,000
March 3, 1881	20,000	August 18, 1898	5,000
August 2, 1882	20,000	June 3, 1896	2,500
July 5, 1884	10,000		
August 5, 1886	7,500	Total	120,000

II 6.

IMPROVEMENT OF GREEN RIVER ABOVE THE MOUTH OF BIG BARREN RIVER, KENTUCKY.

No operations under this project were in progress, the funds being nearly exhausted and existing project completed. The small balance on hand is being held to pay for land for bank protection and a roadway on the abutment side of the river. The title to this land has been examined and found to be so unsatisfactory that recourse to condemnation was decided upon in order to obtain satisfactory title. Accordingly the United States attorney, under date of April 10, 1908, was requested to institute the necessary proceedings. The attempts

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to secure title to this land were begun in October, 1906, and the delay experienced forcibly demonstrates the desirability of modifying the present practice in such matters, so as to facilitate the purchase of land required in connection with river improvements.

Money statement.

July 1, 1907, balance unexpended	$580.17
July 1, 1908, balance unexpended	580.17

APPROPRIATIONS.

July 13, 1892	$50,000.00	June 13, 1902	$180,000.00
August 18, 1894	25,000.00	March 3, 1905	5,000.00
June 3, 1896	20,000.00		
March 3, 1899	85,673.20	Total	365,673.20

COMMERCIAL STATISTICS.

Commercial statistics are given in the following report for "Operating and care of locks and dams on Green and Barren rivers, Kentucky.

II 7.

OPERATING AND CARE OF LOCKS AND DAMS ON GREEN AND BARREN RIVERS, KENTUCKY.

Description of original condition will be found at page 623 of this report. References to more extended information will be found on page 498, Annual Report of the Chief of Engineers for 1904.

The project and estimate for the fiscal year ending June 30, 1908, approved July 22, 1907, provided as follows:

It is proposed to operate the several locks and to make such repairs to them, the dams, guide cribs, dwellings, storehouses, and other Government property at the several locks, as are necessary to maintain the system in good navigable condition and keep the other property in good condition, in connection with which work the snagging and dredging outfits will be operated to keep the pools, lock chambers, and entrances thereto free of snags, mud, leaves, and other obstructions brought into them by the varying stages of water. The system now comprises seven locks and dams, viz, Nos. 1, 2, 3, 4, 5, and 6, Green River, and No. 1, Barren River, together with the contiguous land and buildings owned by the United States.

The estimate for the fiscal year 1907 is summarized as follows:

Regular force	$39,429.00
Repairs	95,523.83
Miscellaneous, supplies, and contingencies	5,000.00
Total	139,952.83

Heavy rains and frequent rises in the river greatly interfered with the progress of repair work. During the year locks in Green River were submerged sufficiently to allow traffic to pass over the dams, as follows: Lock No. 1, one hundred and eight days; Lock No. 2,

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seventy-two days; Lock No. 3, eight days; Lock No. 4, six days. On account of repairs locks were closed to navigation as follows: Lock No. 2, Green River, October 24 to 29, 1907; Lock No. 5, Green River, October 1 to December 15, 1907; Lock No. 1, Barren River, July 15 to 18, 1907.

Under the project and estimate mentioned above, the operations during the fiscal year, in addition to the ordinary work of passing traffic through the locks and ordinary minor current repairs incident to care and preservation, were as follows:

At Lock No. 1, Green River, 70 rods of the old fence at the upper end of the reservation were replaced with Page woven-wire fencing.

At Lock No. 2, Green River, temporary repairs were made to the loosened shafts of the lower culvert valves. All of the valves were discovered to be in bad condition, and an entire new set purchased; these will be put in place at the earliest opportunity. One hundred and fourteen cubic yards of rubblestone were replaced in the apron of the dam and 82 pieces of 10-inch by 10-inch beech timber framed thereon, to replace similar material that had been torn away by high water. Two thousand six hundred and seventy-seven square yards of the slope back of land wall was graded and Bermuda grass planted thereon. A concrete walk, 112 feet long and 3 feet 7 inches wide, was constructed from the lock wall across the slope just mentioned.

At Lock No. 3, Green River, a valve in one of the upper gates and the sheeting between the sections of upper river crib were repaired. Slight repairs were also made to the top of the upper shore crib and to the apron of the dam.

At Lock No. 4, Green River, the work of reconstructing the decayed sections of the upper and lower guide cribs, in progress at the close of last fiscal year, was completed, the upper crib July 25 and the lower crib September 6, 1907.

The section of upper crib rebuilt is 150 feet 2 inches long, 120 feet being of concrete and 30 feet 2 inches of 10-inch by 10-inch beech timber. The foundation consists of the old timber crib, the top of which was removed down to a point 14 inches below pool level; to strengthen this bottom part of the cribbing 36 round beech piles, each 16 feet long, were driven. Twenty of these piles are just within the front face of the crib and are spaced 6 feet, center to center; the other 16 piles were driven along the back line of the foundation part and are spaced 8 feet, center to center; the average penetration of the piles is about 15 feet 8 inches below the crest of the dam; their heads extend into the base of the concrete work about 3 feet. The superstructure has a base width of 7 feet for a vertical distance of 4 feet; it is then stepped to 6 feet wide and the rear face battered, so as to give a top width of 4 feet at the level of the lock wall; the top is supplied with 3 mooring rings and the front face with 1 ladder. The timber section has a base width of 10 feet and is battered on the rear side, so as to give a top width of 6 feet; the cribwork is filled with stone and paved on top.

Cost, not including that reported June 30, 1907:

Labor	$1,027.64
Material	376.54
Total	1,404.18

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The section of the lower crib rebuilt is 63 feet 8 inches long and is of concrete, resting on a foundation of natural slate rock at a depth of about 6 feet below lower pool level. Seven 2-inch steel rods extending down 3 feet in the rock and upward 6 feet into the concrete were placed at regular intervals. The base of the structure is 16 feet wide for a height of 9 feet, then stepped to a width of 12 feet and the face battered so as to give a top width of 5 feet. The top is supplied with two snubbing posts and a hand railing, and the front face with 7 mooring hooks and 1 ladder. In constructing the wall a timber crib 61 feet 4 inches long, 16 feet wide, and 5 feet high was first built of 10 by 10 inch beech timber, sheathed, and placed as a form for the under-water portion of the structure; this forming still remains around the base.

The top of the remaining old timber section of lower crib was repaired.

The cost for work during the fiscal year is:

Labor	$2,303.00
Material	467.25
Barge hire	335.00
Total	3,105.25

The old service track to the warehouse, etc., at this lock was repaired; concrete steps constructed on the slope in front of warehouse; roof of warehouse and outbuildings painted; the machinery, tools, etc., stored here cared for and repaired as needed.

Expenditures:	
Labor	$294.56
Material	3,567.79
Total	3,862.35

At Lock No. 5, Green River, on account of the unfavorable season, due to frequent rains and rises in the river and of finding more extensive leakage than had been anticipated, only a part of the work of making repairs to the floor, foundation, etc., was completed. The work accomplished is briefly described as follows:

Upper wing wall.—This wall was extended into the bank 30 feet 5 inches. The extension is 5 feet wide at bottom, 4 feet wide at top, and rests on a pile foundation at a depth of 15 feet below the top of the lock wall; 14 of the piles are of round beech timber, 25 feet long, and 28 are triple lap sheet piles, 24 feet long.

Lower wing wall.—This wall was extended 22 feet 3 inches, the extension being 6 feet wide at bottom, 5 feet wide at top, and is supported by 8 round piles at a depth of 6 feet 5 inches below the top of the lock wall. The top of the extension is 9 inches higher than the lock wall, and a concrete walk was constructed back from it on a slope 9 feet 6 inches.

Upper cribs.—The tops of the old timber land crib and first and second section of the river crib was removed and replaced with concrete, beginning at 1 foot below upper pool level. The old timber cribwork used as foundation was strengthened by round beech piles driven therein. The concrete section of land crib is 22 feet 7 inches long, 10 feet wide at base; the river crib is 24 feet 8 inches long, 8 feet wide at base; both cribs are battered on the rear faces, so as

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to give a width of 4 feet at top, which is level with the top of lock wall. Each crib is supplied with a snubbing post.

Leak through floor of lock.—Cofferdams were constructed about the lock, the lower gates removed, and efforts made to drain the lock chamber and stop the leakage preparatory to building a new floor of concrete. However, the leakage proved to be so great that it could not be controlled by a 10-inch centrifugal pump kept constantly running, and on account of the lateness of the season and unfavorable weather and water conditions this work had to be temporarily abandoned. In attempting to shut off the leakage extensive excavation was made at the upper end of the lock walls, and a row of triple lap-sheet piles driven, beginning at the new addition to the upper wing wall and extending around the upper end of the lock to the dam; further excavation to a depth of about 5 feet was then made between this row of piles and the lock wall and this space filled with concrete to 1 foot above the heads of the piles.

Expenditures:

Labor	$9,523.80
Material	8,324.57
Barge hire	244.50
Total	18,092.87

Work has now been resumed and it is proposed to cut the dam, construct the necessary coffers, and continue the row of sheet piling and concrete reenforcement along the outer side of the river wall and across the lower end of the lock. By doing this it is thought that the leakage can be stopped, and that by placing some necessary patches of concrete on the floor the renewal of the entire floor at this time will not be essential.

Upper guide piles.—The line of guide piles above the upper river crib was replaced by new hickory piles framed securely together. Cost, $184.73.

At Lock No. 6, Green River, a flight of concrete steps up the slope at the end of the upper wing wall, and from the end of this a concrete walk 3 feet wide and 250 feet long to the dwellings were constructed.

Expended:

Labor	$175.08
Material	66.00
Total	241.08

Six hundred and five cubic yards large stone were placed below the dam, 1,561 square yards of slope below abutment riprapped, 348 square yards of which had previously been riprapped and displaced by high water; 147 square yards of the slope below the lock were planted with Bermuda grass, and two coal sheds 24 feet long by 12 feet wide built.

Expended:

Labor	$358.41
Material	321.34
Total	679.75

At Lock No. 1, Barren River, a concrete lower river guide wall, 30 feet long, was constructed. The foundation for the concrete work is a new timber crib, 30 feet long, 18 feet wide, 6 feet high, filled with stone. In the cribwork there were driven 28 round beech piles, 28

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feet long, penetrating into the river bed an average depth of about 19 feet. Along the front face there are thirty 4-inch sheet piles, 22 feet long, penetrating about 9 feet. The heads of the round piles extend into the concrete about 2 feet. The concrete superstructure has a base width of 12 feet for a height of 6 feet; it is then stepped on the rear face to a width of 10 feet, and is then battered to give a top width of 5 feet at a height level with the top of the lock wall. The face is supplied with 5 mooring hooks, the lower end with a ladder, and the top with a mooring ring and a hand railing.

Expenditures:	
Labor	$1,072.89
Material	171.67
Barge hire	147.00
Total	1,391.56

Repairs were made to the channel carrying the miter post of the shore leaf of the lower steel gate of the lock, to the anchor bolts, and to the valves.

Snag boat Wm. Preston Dixon.—This boat was in commission eight months and twenty-three days, and, together with her crew, was engaged in the general work of removing snags from the several pools; towing material for the repair work at the several locks, and assisting in that work; towing the Green River dredge and one barge to the Louisville and Portland Canal for repairs, and later towing the dredge back to Green River.

Following is a summary of work done:

As snag boat:	
Snags removed, Pool No. 1, Green River	66
Snags removed, Pool No. 2, Green River	130
Snags removed, Pool No. 3, Green River	145
Trees deadened, Pool No. 3, Green River	3
Trees removed, Pool No. 3, Green River	27
Snags removed, Pool No. 4, Green and Barren rivers	161
Snags removed, Pool No. 6, Green River	8
Snags removed, Pool No. 1, Barren River	5
Miles run as snag boat	997
As towboat:	
Derrick boats towed	43
Barges towed	60
Quarter boats towed	3
Dredges towed	3
Scows towed	3
Miles run as towboat	2,636
Miscellaneous:	
Inspection trips made	11
Miles run	1,389

While this boat was in ordinary the timber portion of her two steam capstans was renewed; the deck bulkhead, nosing, and roof patched; the furnace rebuilt and new liners and grate bars put in; the wheel, boiler, water tanks, and machinery thoroughly repaired; the means of introducing feed water into the boilers changed; the boat cleaned and painted, and minor repairs made.

Expended:	
Labor	$657.75
Material	987.93
Total	1,645.68

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Towboat Emerald.—This boat was in commission from July 1, 1907, to February 6, 1908, and from May 15, 1908, to the close of the fiscal year, and was engaged in miscellaneous towing in connection with the repair work at the several locks on Green, Barren, and Rough rivers; in inspection work, and acting as dredge tender, as follows:

As towboat:	
Derrick boats towed	43
Barges towed	103
Dredges towed	6
Scows towed	8
Miles run as towboat	3,211
As dredge tender:	
Scows towed	183
Barges towed	12
Miles run as dredge tender	54
Miscellaneous:	
Trips made	8
Miles run	431

During the winter season the old stack knees, old rudder, two kevels, eight swinging fenders, and the smokestack were removed and replaced with new material; the deck bulkhead, nosing, and roof patched; the furnace rebuilt and new liners and grate bars put in; the wheel, boiler, and machinery thoroughly repaired, and the boat scrubbed and painted.

Expended:	
Labor	$272.02
Material	146.61
Total	418.63

Towboat Shawnee.—This boat was temporarily employed on this river in connection with repair work at Locks Nos. 2 and 3, Green River, from September 13 to November 30, 1907; following is a summary of her work:

As towboat:	
Derrick boats towed	8
Barges towed	17
Dredges towed	1
Scows towed	2
Miles run	1,906

Dredge Green River.—This boat was engaged in dredging operations from July 1, 1907, to January 6, 1908. She prepared the foundation for lower shore concrete crib at Lock No. 4, Green River, and assisted in the work at Lock No. 5, Green River. A synopsis of work done follows:

Lock No. 1, Green River:		
Mud and leaves from upper approach	cubic yards	4,570
Mud and leaves from lower approach	do	1,710
Logs from upper approach	number	8
Logs from lower approach	do	5
Lock No. 2, Green River:		
Mud and leaves from upper approach	cubic yards	2,855
Mud and leaves from lower approach	do	2,800
Logs from lower approach	number	4
Lock No. 4, Green River:		
Material from bar below lock	cubic yards	900
Material from upper approach	do	75

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Lock No. 5, Green River:		
Material from bar below lock	cubic yards	5,874
Material from lower approach	do	290
Material from upper approach	do	930
Lock No. 6, Green River:		
Material from upper approach	do	300
Mammoth Cave Landing:		
Material	do	970
Logs	number	8
At Mouth of Echo River:		
Material	cubic yards	1,659
Stone, large bowlders	do	20
Houchins Ford:		
Material	do	1,890
Snags	number	47
Christmas Island:		
Material	cubic yards	2,730
Snags	number	14
Sand Cave Island: Snags	do	2
Brownsville Ferry: Snags	do	1
Davis Ferry:		
Material	cubic yards	80
Snags	number	8

This boat was placed in the Louisville and Portland Canal dry dock during the month of May, 1908, and received such repairs as were necessary to put her in serviceable condition. The expense of these repairs amounted to $2,762.58.

Two new barges.—During the fiscal year two new barges, each 100 feet long, 22 feet wide, 5 feet 7¼ inches deep at gunwales, were built at the Louisville and Portland Canal dry dock for this river. The timber used was Oregon fir and the total cost of the two barges was $5,228.10.

New steel hull for snag boat.—The work proposed under this heading is a new steel hull, cabin, wheel, cylinder beams, new shears, etc., to which will be transferred the machinery and equipment now on the old snag boat *Wm. Preston Dixon.* It is expected to make the transfer of the machinery, etc., and install it in the new hull by hired labor at the shops of the Louisville and Portland Canal. The hull, etc., is now being built under contract, of which a synopsis is given below.

Other floating plant.—While the plant was in ordinary, scows, derrick boats, quarter boat, barges, and rowboats were overhauled and repairs made where necessary to place them in serviceable condition for the ensuing season's operation.

Summary of expenditures on account of "Operating and care of Green and Barren rivers, Kentucky," fiscal year 1908, showing general items and amount expended under each heading.

Items.	Amount.
Services	$63,124.33
Supplies	6,985.16
Materials	25,740.62
Miscellaneous	801.33
Total	96,601.49

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Collections.

1907.		
July 5.	Jett & Turner, water power, Lock No. 2, Green River	$50
July 9.	William Boulton, water power, Lock No. 1, Barren River	75
1908.		
Jan. 4.	Jett & Turner, water power, Lock No. 2, Green River	50
Jan. 4.	Craig Brothers, water power, Lock No. 3, Green River	75
Jan. 7.	R. C. Bryant, water power, Lock No. 2, Green River	150
	Total	400

All of these collections were deposited to the credit of the Treasurer of the United States.

APPROPRIATIONS AND ALLOTMENTS.

August 11, 1888	$135,000.00	July 22, 1899	$65,007.65
January 4, 1889	167,112.00	July 17, 1900	69,349.64
July 20, 1889	139,110.00	July 10, 1901	43,236.82
July 17, 1890	53,783.47	July 30, 1902	105,629.33
July 16, 1891	77,807.26	July 20, 1903	34,720.47
July 15, 1892	46,264.26	July 25, 1904	23,610.25
July 15, 1893	49,730.88	July 17, 1905	48,517.10
July 13, 1894	25,927.23	July 16, 1906	73,129.48
January 26, 1895	6,000.00	July 22, 1907	96,856.93
July 20, 1896	51,080.31	Sept. 21, 1907	40,000.00
September 2, 1896	77,684.35		
July 23, 1897	57,459.61	Total	1,557,236.79
July 15, 1898	70,219.76		

CONTRACT IN FORCE.

Contractor: Ed. J. Howard.
Date of contract: December 13, 1907.
Date of approval of contract: January 7, 1908.
Date of notification of approval of contract: January 17, 1908.
Date of completion of contract: On or before the expiration of forty-six calendar weeks, after date of notification of approval of contract.
For steel hull, cabin, etc., for snag boat.
Price: $30,830.
Liquidated damages: In case of failure to complete and deliver within stipulated time, $25 for each and every day of delay.

COMMERCIAL STATISTICS.

Statement of traffic passing the locks on Green and Barren rivers from July 1, 1907, to June 30, 1908.

Kind of craft.	Green River.							
	Lock No. 1.		Lock No. 2.		Lock No. 3.		Lock No. 4.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Passenger boats	566	62,058	517	57,919	1,157	65,825	508	64,889
Towboats	1,130	59,361	601	27,691	457	24,592	530	30,430
Government boats	10	1,895	30	5,859	40	6,540	189	31,843
Barges	2,910	835,217	1,440	601,054	1,154	574,159	987	391,658
Small craft	546	6,289	278	1,971	278	1,554	206	2,812
Rafts	294	.....	290	.....	226	.....	90	.....
Total	5,456	964,815	3,156	694,494	3,312	672,670	2,510	521,127
Lockages, fiscal year	3,563	.....	2,807	.....	3,695	.....	2,545	.....

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Statement of traffic passing the locks on Green and Barren rivers from July 1, 1907, to June 30, 1908—Continued.

Kind of craft.	Green River.				Barren River.	
	Lock No. 5.		Lock No. 6.		Lock No. 1.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Passenger boats	168	14,000	109	9,017	542	68,728
Towboats	325	18,687	268	12,110	223	12,252
Government boats	106	16,107	42	7,040	83	12,675
Barges	661	272,311	354	184,660	355	113,138
Small craft	161	2,270	695	783	140	465
Rafts	45	.....	35	.....	5	.....
Total	1,466	323,375	1,503	213,610	1,348	207,258
Lockages, fiscal year	1,480	.....	1,694	.....	1,291	.....

Statement of commerce passing the locks on Green and Barren rivers from July 1, 1907, to June 30, 1908.

Articles.	Green River.						Barren River.
	Lock No. 1.	Lock No. 2.	Lock No. 3.	Lock No. 4.	Lock No. 5.	Lock No. 6.	Lock No. 1
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal	43,066	655	7,657	13,374	1,533	183	10,798
Corn	1,321	313	139	93	79	33	218
Wheat	384	230	71	53	.....	.....	44
Salt	1,104	876	561	318	118	32	279
Oil	460	363	288	115	94	8	172
Whisky	4	3	5	2	.....	.....	1
Flour	1,166	918	526	424	202	43	492
Sugar	1,176	978	617	321	46	18	301
Molasses	39	22	8	13	2	1	19
Cement	46	56	6	4	262	.....	209
Tobacco	2,383	1,764	263	8	.....	.....	3
Hides	5	5	2	4	.....	.....	2
Hay	97	168	132	155	97	69	172
Straw	17	4	.....	4	4	.....	.....
Cattle	1,870	1,000	550	180	2	.....	58
Swine and sheep	1,414	861	556	239	1	.....	107
Horses and mules	117	91	81	86	1	1	97
Lumber	9,000	5,029	890	208	289	335	269
Timber	147,824	109,684	87,018	30,308	21,400	16,515	4,874
Staves	7,164	3,547	26	36	.....	.....	32
Shingles	17	18	3	6	.....	.....	3
Ties, railroad	234,478	207,721	183,247	112,834	75,440	45,378	8,622
Hoop poles	388	440	310	181	158	.....	165
Manufactured iron	55	67	2	4	12	9	19
Asphalt	.....	.....	.....	.....	5,452	.....	.....
Miscellaneous	22,684	18,461	10,924	5,807½	3,745	2,684	9,784
Total	476,274	353,269	293,582	167,227½	108,887	65,309	37,201
Passengers .....number..	14,463	7,201	11,304	7,047	2,137	1,969	3,511

Comparative statement of traffic and commerce, Green and Barren rivers, Kentucky.

Fiscal year.	Traffic.									
	Lock No. 1, Green River.					Lock No. 2, Green River.				
	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
1889	284	129	350	138	901	272	107	300	15	694
1890	854	386	1,079	111	2,430	776	286	768	12	1,842
1891	875	456	1,082	152	2,565	768	358	721	24	1,871
1892	787	449	898	184	2,318	634	272	785	6	1,697
1893	823	506	914	161	2,404	304	379	745	9	1,437
1894	832	437	602	176	2,047	477	333	413	9	1,232
1895	789	606	240	264	1,899	652	494	152	46	1,344
1896	1,143	553	620	162	2,478	702	469	440	168	1,779
1897	919	539	226	157	1,841	935	632	239	252	2,058
1898	1,122	882	340	200	2,544	1,037	847	260	182	2,326
1899	1,174	803	570	169	2,716	948	819	469	184	2,420
1900	1,088	1,239	481	132	2,940	946	1,087	521	156	2,710
1901	1,360	1,765	592	139	3,856	1,220	1,443	302	137	3,102

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Comparative statement of traffic and commerce, Green and Barren rivers, Kentucky—Continued.

Fiscal year.	Traffic.									
	Lock No. 1, Green River.					Lock No. 2, Green River.				
	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
1882	992	1,113	530	137	2,772	820	927	364	255	2,366
1883	1,077	1,403	608	158	3,246	982	1,044	408	229	2,663
1884	1,378	2,127	338	185	4,028	1,105	1,384	227	207	2,923
1885	1,339	2,275	454	253	4,321	1,058	1,297	350	231	2,939
1886	1,449	1,729	262	377	3,817	1,095	1,033	322	236	2,686
1887	1,531	2,525	309	542	4,907	1,221	937	283	297	2,733
1888	1,706	2,910	294	546	5,456	1,148	1,440	290	278	3,156

Fiscal year.	Traffic.									
	Lock No. 3, Green River.					Lock No. 4, Green River.				
	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
1879	.....	.....	200	.....	200	115	49	41	51	256
1880	.....	.....	.....	.....	.....	126	55	36	123	340
1881	225	57	372	101	755	399	141	87	134	761
1882	492	305	426	212	1,435	619	276	208	129	1,232
1883	509	269	560	249	1,587	553	333	292	144	1,332
1884	611	469	304	227	1,611	592	391	117	115	1,215
1885	711	456	123	212	1,502	866	471	54	116	1,507
1886	880	486	234	238	1,838	1,307	676	112	102	2,197
1887	867	522	103	144	1,636	1,249	820	53	53	2,175
1888	835	613	133	167	1,748	1,192	884	39	176	2,291
1889	712	532	315	220	1,779	1,073	828	159	141	2,201
1890	750	695	288	158	1,891	1,099	929	122	138	2,288
1891	1,019	1,081	202	108	2,410	1,347	1,017	75	141	2,580
1892	757	780	293	223	2,053	1,012	814	102	229	2,157
1893	717	707	278	233	1,935	1,049	763	111	249	2,172
1894	827	893	191	146	2,057	910	817	68	86	1,881
1895	775	910	301	171	2,157	1,115	917	84	103	2,219
1896	1,111	645	274	262	2,292	957	726	117	108	1,908
1897	1,366	773	114	203	2,456	1,224	891	111	212	2,438
1898	1,654	1,154	226	278	3,312	1,228	987	90	206	2,510

Fiscal year.	Traffic.									
	Lock No. 5, Green River.					Lock No. 6, Green River.				
	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
1889	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1891	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1892	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1893	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1894	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1895	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1896	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1897	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1898	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1899	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1900	238	255	47	76	616	.....	.....	.....	.....	.....
1901	376	383	29	217	1,005	.....	.....	.....	.....	.....
1902	391	388	53	182	1,014	.....	.....	.....	.....	.....
1903	393	465	59	208	1,125	.....	.....	.....	.....	.....
1904	520	646	49	207	1,422	.....	.....	.....	.....	.....
1905	731	633	87	272	1,723	.....	.....	.....	.....	.....
1906	774	480	73	104	1,431	290	167	52	123	632
1907	690	570	57	119	1,436	446	334	47	473	1,300
1908	599	661	45	161	1,466	419	354	35	695	1,503

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Comparative statement of traffic and commerce, Green and Barren rivers, Kentucky—Continued.

Fiscal year.	Traffic. Lock No. 1, Barren River. Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.	Commerce. Green River. Lock No. 1.	Lock No. 2.	Lock No. 3.
	No.	*No.*	*No.*	*No.*	*No.*	*Tons.*	*Tons.*	*Tons.*
1889	112	57	10	85	264			
1890	23	20	8	13	64			
1891	342	177	7	3	529			
1892	555	180	36	30	801			
1893	518	290	32	14	854			
1894	534	347	22	42	945			
1895	618	335	32	56	1,041			
1896	859	351	15	36	1,261			
1897	842	451	10	104	1,407			
1898	789	553	1	86	1,429	193,475	161,841	108,107
1899	826	528	3	119	1,476	267,104	184,895	84,120
1900	797	462	4	103	1,366	378,684	288,948	172,916
1901	992	497	20	93	1,602	452,522	285,744	183,513
1902	859	499	10	108	1,476	385,548	242,722	153,987
1903	1,066	653	13	120	1,852	457,336	259,143	165,749
1904	819	496	5	53	1,363	329,806	253,979	170,788
1905	961	404	1	159	1,525	466,015	303,274	257,181
1906	1,212	462	8	71	1,753	342,495	242,601	201,823
1907	998	445	9	78	1,530	372,915	271,762	205,497
1908	748	355	5	140	1,348	476,274	353,269	268,883

Fiscal year.	Commerce. Green River. Lock No. 4.	Lock No. 5.	Lock No. 6.	Barren River. Lock No. 1.
	Tons.	*Tons.*	*Tons.*	*Tons.*
1889				
1890				
1891				
1892				
1893				
1894				
1895				
1896				
1897				
1898	84,761			28,453
1899	43,973			43,804
1900	139,530	47,098		31,355
1901	117,064	57,058		46,445
1902	110,468	47,940		30,646
1903	106,119	59,525		46,738
1904	108,294	69,226		33,982
1905	157,208	107,848		35,466
1906	111,316	75,468	34,325	61,020
1907	135,320	95,099	58,621	43,993
1908	167,227½	108,887	65,309	37,201

List of boats plying on Green, Barren, and Rough rivers, Kentucky, during fiscal year ending June 30, 1908.

Name of boat.	Character.	Tonnage.
Wm. Preston Dixon	U. S. snag boat	200
Shawnee	U. S. towboat	120
Emerald	do	20
Evansville	Packet boat	144
Bowling Green	do	123
Chaperon	do	95
Spottsville	do	93
Nellie	do	85
We Three	do	13
Leona	do	12

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List of boats plying on Green, Barren, and Rough rivers, Kentucky, during fiscal year ending June 30, 1908—Continued.

Name of boat.	Character.	Tonnage.
Anna Bell	Packet boat	12
Kaliste	do	9
Little Clyde	Tow	99
Nellie Willet	do	98
Mary Lacy	do	98
J. M. Bowell	do	94
Frances	do	93
D. A. Nisbet	do	85
Neptune	do	80
Mary Stewart	do	77
Kenois	do	69
Thos Parker	do	69
Reba Reeves	do	68
Penguin	do	60
Antoinette	do	54
Allie	do	53
Emma	do	53
Alfred Owen	do	52
Burnadina King	do	50
J. B. A	do	51
Mabel	do	49
Samuel	do	48
Alma	do	42
Meter	do	39
Edna Russell	do	37
Norway	do	24
Repose	do	14
Cruiser	do	13
Brick	do	12
Hustling John	do	12
Beniah Ray	do	12
Hornet	do	12
Maud	do	10
Beaver	do	10
Katherine	do	10
Margret R	do	10
S. & Y. Sawyer	do	9
Augusta	do	9
R. K. O	do	9
Outing	do	9
Duce	do	8
Uncle Tom	do	8
Levi	do	8
Leavenworth	do	8
White Duck	Towboat	7
Laura	do	7
R. Nash	do	6
Clara	do	6
Clyde	do	5
Round Up	Pleasure boat	4
Mildred	do	4
Stella	do	4
Raymond	do	4
Victor H	do	4
Dolphin	do	4
Pansy	do	3
Thelma	do	3
Sweetheart	do	3
Agnes May	do	3
Ethel T	do	2
Fannie G	do	2
Edward B	do	2
Geo. S	do	2
Pearl	do	2
Dayton	do	2
Midget	do	2
Rambler	do	Not known.
Bertha K	do	Do.
Trail	do	Do.
Little Era	do	Do.
J. E. Johnson	do	Do.
Quigg	do	Do.
Nuisance	do	Do.
Mogul	do	Do.
White Cat	do	Do.
Madam	do	Do.
Bachelor	do	Do.
Busy Izzy	do	Do.

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List of boats plying on Green, Barren, and Rough rivers, Kentucky, during fiscal year ending June 30, 1908—Continued.

Name of boat.	Character.	Tonnage.
George Edwin	Pleasure boat	Not known.
Sunbeam	do	Do.
Skate	do	Do.
Skipper	do	Do.
Skipper	do	Do.
Devil	do	Do.
Myrtle	do	Do.
Blissie May	do	Do.
Wadsworth	do	Do.
Agnes	do	Do.
Harral L	do	Do.
Helen	do	Do.
Streak	do	Do.
Blue Wing	do	Do.
Ben Hur	do	Do.
Nuf Ced	do	Do.
Cricket	do	Do.
Princess	do	Do.
Albatross	do	Do.
Caribre	do	Do.
Lelia	do	Do.
Ruth	do	Do.
Kinlock	do	Do.
Green River	do	Do.
Elsie	do	Do.
Golden Rod	do	Do.
Crawford	do	Do.
Dixie	do	Do.
Isabella	do	Do.

I I 8.

IMPROVEMENT OF ROUGH RIVER, KENTUCKY.

A complete synopsis of the projects under the improvement of which this river has progressed may be found on pages 2599 to 2602, Annual Report of the Chief of Engineers for 1899. References to more extended information will be found on page 501, Annual Report of the Chief of Engineers for 1904.

The work outlined in the project has been completed.

During the year $89.52 was expended for supplies.

There being no further extension of the project proposed or contemplated, the small balance, $17.27, held to meet outstanding liabilities of many years' standing, was deposited to the credit of the Treasurer of the United States, in accordance with authority granted by the Chief of Engineers, U. S. Army, who also authorized the discontinuance of further reports concerning this improvement.

Money statement.

July 1, 1907, balance unexpended	$106.79
June 30, 1908, amount expended during fiscal year for maintenance of improvement	89.52
July 1, 1908, balance unexpended	17.27
July 1, 1908, outstanding liabilities	17.27

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APPROPRIATIONS.

September 19, 1890	$25,000
July 13, 1892	15,000
August 18, 1894	22,500
June 3, 1896	43,000
Total	105,500

II 9.

OPERATING AND CARE OF LOCK AND DAM ON ROUGH RIVER, KENTUCKY.

The estimate and project for the operation and care of this lock and its appurtenant structures during the fiscal year ending June 30, 1908, contained the following items, the funds for which were made available by allotment July 12, 1907:

Regular force	$708
Repairs, supplies, etc	1,000
Total	1,708

Expenditures during the year were for payment of the lock tender, messenger service between the lock and nearest post route, minor current repairs as needed, clearing drift from the upper approach to the lock, placing 455 square yards of riprap paving on the bank below lower shore crib, and removal of snags, trees, etc., from the river between its mouth and Hartford, Ky. A summary of the latter work follows:

Snags removed		189
Stumps removed		39
Whole trees removed		145
Trees deadened		138
Mud removed	cubic yards	1,067
Miles worked over		30

In addition to the foregoing the lock gates and gauges were repainted and the fences and outbuildings whitewashed.

Summary of expenditures on account of operating and care of Rough River, Kentucky, during the fiscal year 1908, showing general items and amount expended under each heading.

Items.	Amount.
Services	$893.12
Materials	11.03
Total	904.15

ALLOTMENTS.

July 23, 1897	$2,086.00	July 14, 1904	$1,029.66
July 22, 1899	714.97	July 17, 1905	1,117.04
July 17, 1900	686.31	July 12, 1906	1,013.95
July 10, 1901	763.66	July 12, 1907	1,363.07
August 5, 1902	1,079.62		
July 20, 1903	664.03	Total	10,518.31

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COMMERCIAL STATISTICS.

Statements of traffic and commerce passing Lock No. 1, Rough River, Kentucky, from July 1, 1907, to June 30, 1908.

TRAFFIC.

Kind of boat.	Number.	Tonnage.
Passenger	108	1,898
Tow	100	1,256
Government	9	226
Barges	95	19,870
Small craft	457	1,283
Rafts	151	.....
Total	920	24,221

Total number of lockages during the fiscal year 1908, 917.

COMMERCE.

Articles.	Quantity.	Articles.	Quantity.
	Tons.		*Tons.*
Coal	25	Cattle	11
Corn	92	Swine and sheep	1
Wheat	139	Lumber	4
Salt	69	Timber	32,394
Oil	33	Ties, railroad	3,387
Flour	68	Manufactured iron	41
Sugar	56	Miscellaneous	483
Cement	13		
Hay	16	Total	37,168
Tobacco	12		

Number of passengers, 500.

For list of boats plying on this river see page 1888 of this report.

Comparative statement of traffic and commerce at Lock No. 1, Rough River, Kentucky.

Fiscal year.	Traffic.					Commerce.
	Steamboats.	Barges and flats.	Rafts.	Miscellaneous.	Total.	
						Tons.
1891	.....	.....	.....	.....	.....	90,161
1892	.....	.....	.....	.....	.....	50,000
1893	.....	.....	.....	.....	.....	75,000
1894	.....	.....	.....	.....	.....	64,401
1895	.....	.....	.....	.....	.....	36,945
1896	.....	.....	.....	.....	.....	30,445
1897	.....	.....	.....	.....	.....	16,538
1898	81	70	178	154	483	15,458
1899	164	29	207	132	532	21,833
1900	260	72	270	168	770	41,411
1901	175	114	121	247	657	20,666
1902	98	105	111	191	505	21,703
1903	128	76	133	235	572	32,919
1904	182	216	115	137	650	33,076
1905	192	219	160	126	697	55,333
1906	257	164	151	303	875	86,800
1907	202	75	144	434	856	30,084
1908	217	95	151	457	920	37,168

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APPENDIX J J.

IMPROVEMENT OF RIVERS AND HARBORS IN THE DULUTH, MINNESOTA, DISTRICT.

REPORT OF MAJ. GRAHAM D. FITCH, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Harbor at Grand Marais, Minnesota.
2. Harbor at Agate Bay, Minnesota.
3. Harbor at Duluth, Minnesota, and Superior, Wisconsin.
4. Harbor at Port Wing, Wisconsin.
5. Harbor at Ashland, Wisconsin.
6. Harbor at Ontonagon, Michigan.
7. Waterway from Keweenaw Bay to Lake Superior, Michigan.
8. Harbor at Marquette, Michigan.
9. Harbor of refuge, Marquette Bay, Michigan.
10. Harbor of refuge at Grand Marais, Michigan.
11. Removing sunken vessels or craft obstructing or endangering navigation.

UNITED STATES ENGINEER OFFICE,
Duluth, Minn., July 14, 1908.

SIR: In compliance with General Orders, No. 4, War Department, Office of the Chief of Engineers, Washington, April 15, 1908, I have the honor to transmit herewith my annual report of the works under my charge in the Duluth, Minn., district for the fiscal year ending June 30, 1908.

Very respectfully,

GRAHAM D. FITCH,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

J J 1.

IMPROVEMENT OF HARBOR AT GRAND MARAIS, MINNESOTA.

The object of the improvement is to provide a harbor for purposes of refuge and for commerce.

For a description of the harbor and of improvements accomplished, see reports of the Chief of Engineers, United States Army, for previous years.

No work was done at this harbor by the United States during the last fiscal year.

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Money statement.

July 1, 1907, balance unexpended	$6.663.32
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	584.30
July 1, 1908, balance unexpended	6.079.02
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	2,000.00

APPROPRIATIONS.

March 1, 1879	$10,000	August 18, 1894	$3,000
June 14, 1880	10,000	June 3, 1896	3,000
March 3, 1881	20,000	March 3, 1899	30,000
August 2, 1882	20,000	June 13, 1902	2,000
July 5, 1884	10,000	March 3, 1905	2,000
August 5, 1886	10,000	March 2, 1907	5,000
August 11, 1888	15,000		
September 19, 1890	22,350	Total	172,350
July 13, 1892	10,000		

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Grand Marais, Minn., for the calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Estimated net registered tonnage.
Steam	588	588	1,176	411,608
Decrease			48	16,808

Passengers arriving, 4,000; departing, 4,000; total, 8,000.

Receipts and shipments of freight.

[Tons of 2,000 pounds.]

Receipts.	Tons.	Shipments.	Tons.
Meats	260	Railroad ties (180 000)	2,700
Flour and mill stuff	925	Pulp wood (15 000 cords)	30,000
Grain	425	Lumber (7,000 M feet)	8,000
Miscellaneous merchandise	3,500	Shingles	375
Live stock (50 head)	25	Lath (5,400 M)	675
		Miscellaneous merchandise	1,200
		Fish	100
Total	5,135	Total	43,050

Total receipts and shipments, 48,185 tons; increase, 17,275; equal to 56 per cent.
Total valuation, $1,471,555; increase, $501,472; equal to 34 per cent.
Logs shipped, about 4,500,000 feet B. M., valued at $67,500.

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J J 2.

IMPROVEMENT OF HARBOR AT AGATE BAY, MINNESOTA.

For a detailed description of this harbor, see earlier reports of the Chief of Engineers, United States Army.

No work was done by the United States at this harbor during the last fiscal year.

The Duluth and Iron Range Railroad Company, in 1907, began the construction of ore dock No. 6, to extend 1,150 feet out from the shore line and to same distance as No. 5, lying on the southwesterly side of the latter. The superstructure is of steel, and this dock is noted for being the first one in this country to be constructed of that material.

In the case of the United States *v.* The Davidson Steamship Company for damages to the east breakwater caused by the steamer *Shenandoah* in July, 1901, the steamship company, on August 5, 1907, paid to the United States the award of the courts, being the sum of $4,012.50. This was the final act in the litigation, which was in progress for six years.

Money statement.

July 1, 1907, balance unexpended	$2,116.66
Received as compensation for damages[a]	4,012.50
	6,129.16
June 30, 1908, amount expended during fiscal year for maintenance of improvement	222.54
July 1, 1908, balance unexpended	5,906.62
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	2,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 5, 1886	$22,500.00	June 13, 1902	$2,000.00
August 11, 1888	15,000.00	March 3, 1905	2,000.00
September 19, 1890	25,000.00	March 3, 1905 (allotment)	500.00
July 13, 1892	30,000.00	March 2, 1907	4,000.00
August 18, 1894	30,000.00	Miscellaneous	4,078.69
June 3, 1896	50,000.00		
March 3, 1899	71,708.00	Total	256,786.69

[a] Four thousand and twelve dollars and fifty cents deposited with Treasury September 6, 1907, account judgment against the Davidson Steamship Company for damages to the breakwater in 1902 by the steamer *Shenandoah*. (E. D. 41088–16, Sept. 6, 1907.)

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COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Agate Bay, Minn., for the calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Estimated net registered tonnage.
Steam	1,360	1,360	2,720	.....
Tow	400	400	800	.....
Total	1,760	1,760	3,520	18,000,000

Decrease in number of vessels under 1906, 398; increase in registered tonnage, 594,000.
Passengers arriving, 8,361; departing, 7,904; total, 16,265.

Receipts and shipments of freight.

[Tons of 2,000 pounds.]

Receipts.	Tons.	Shipments.	Tons.
Manufactured iron	1,442	Iron ore	9,171,574
Fish	2	Lumber (60,234 M feet)	90,351
Coal, soft	308,189	Miscellaneous merchandise	194
Total	309,633	Total	9,262,119

Total receipts and shipments, 9,571,752 tons; increase, 4,878.
Total valuation, $26,780,191; decrease, $1,917,752, equal to 6.6 per cent.
Average cargo of iron ore in 1906, 5,949 gross tons.
Average cargo of iron ore in 1907, 6,203 gross tons.
Increase in 1907, 254 tons per load, 4.27 per cent.

JJ 3.

IMPROVEMENT OF HARBOR AT DULUTH, MINNESOTA, AND SUPERIOR, WISCONSIN.

For the history of this harbor and the Government improvements, see Reports of the Chief of Engineers, United States Army, for 1901, Appendix K K, page 2828, and previous years. A detailed description of the condition of channels and other improvements is given in Bulletin No. 18, issued April, 1908, from the office of the survey of Northern and Northwestern Lakes, pages 44 to 58.

Dredging.—The following dredging has been done during the year, between the dates of July 17, 1907, and June 30, 1908, under contract with the Duluth-Superior Dredging Company:

Locality.	Yards.	Price.	Contract cost.
		Cents.	
Deepening lake approach to Duluth Canal	46,121	25	$11,530.25
Widening channels near Northern Pacific bridge	412,240	10	41,224.00
Removing shoals near Northern Pacific bridge	15,778	10	1,577.80
Removing shoals near Nemadji River	505,845	10	50,584.50
Deepening lake approach to Superior entry	93,897	25	23,474.25
Total	1,073,881	.....	128,390.80

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The deepening of the approach to the Duluth Canal was done in July and August, 1907, and provided a depth of 30 feet or more for the entire width of 300 feet on the prolongation of the channel between the canal piers and for an additional width of 30 feet to the southward of the line of the south pier. It extended for a distance of 805 feet into the lake, where a natural depth of 31 feet was reached. The average depth left by the dredge was 32½ feet. All depths are referred to low-water datum. The immediate occasion of this work was the reported striking of the bottom of the lake by two vessels which were entering the harbor in the great storm of November, 1905. The least depth on the center line of the approach in December, 1905, was 26 feet. In February, 1907, a least depth of 24.5 feet was found on the center line. With the recent dredging to more than 30 feet it is believed there will be no possibility of any vessel striking the bottom.

The lake approach to the Superior entry also was deepened by dredging for the same purpose as at the Duluth approach. This was done in October and November, 1907, and gave a depth of 30 feet or more for the entire width of 350 feet and for a distance of 1,000 feet into the lake, where a natural depth of 31 feet was reached. The average depth of this dredging was 31.8 feet. Previous to this dredging the least depth on the center line of this approach was 24 feet.

Shoaling in the vicinity of the Nemadji River has been quite extensive, caused by deposits of silt brought down by that river in high water. This is the only locality in the entire harbor subject to serious shoaling. The shoaling affects the westerly portion of the Superior harbor basin and the southerly portion of the Superior front channel. The dredging in 1907 was between the dates of July 17 and November 27. An area of 48 acres was deepened. Of this area there were 19 acres where the shoaling was worst, and here the dredging was done to an average depth of about 27.6 feet and a least depth of 24 feet. The remaining 29 acres was dredged to an average depth of about 23.7 feet and a least depth of 22 feet. It is probable that no further dredging at this locality will be required for at least two years.

Dredging was done to widen the channels in St. Louis Bay at the approaches to the Northern Pacific Railway bridge, made necessary by the reconstruction of the two draw spans of increased dimensions and located some distance farther out from the harbor line. This dredging was done between the dates of October 14, 1907, and June 30, 1908. The resulting depth was 21 feet or more. The entire contract with the Duluth-Superior Dredging Company was completed June 30, 1908.

The material dredged was disposed of as follows: That from the lake approach to the Duluth Canal was used by the contractors for filling docks. That from the approach to the Superior entry and from the shoal near the Nemadji River was dumped on the lake side of Minnesota Point at the Barrens, as close inshore as it was possible to reach with the scows, for the purpose of widening and strengthening the point at this narrow place where seas have in recent years made breaches through the ridge of sand. The dredgings from St. Louis Bay were dumped in the deep water of the lake about a mile out in front of the Duluth Canal. The material dredged consisted of mud and clay, some of it mixed with sand, and will go toward making a holding ground for anchors.

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The contractors brought out a new dipper dredge on this work, called the "*Old Hickory.*" It has a 10-yard dipper. Its best day's work, of sixteen hours, was over 11,000 yards, and 195,000 yards in one month.

Soundings were taken through the ice during the winter of 1907–8 covering the areas dredged the preceding season and some other portions of the harbor. The number of soundings was 30,000, and these were taken through ice having an average thickness of 15 inches with the use of a boring machine. These soundings were mapped on a scale of 100 feet to the inch, and show a bottom which is fairly uniform for dipper-dredge work and free from shoals that would obstruct vessels.

Since the extensive dredging contracts for the construction of channels in this harbor, which were completed in 1902, shoals have been removed to the extent of 624,795 yards and a contract cost of $65,074 and a total cost with administration of about $72,000, which is an average of $12,000 a year for the six years. This will afford some idea of the cost of maintenance of the channels, but this amount is probably less than the average will be for a long term of years, for the reason that there must be more or less shoaling in other portions of the channels, which is so small in amount as not yet to form an obstruction but which may require attention later.

Enlargement of East Gate Basin.—For a number of years sand has been dredged from the easterly side of the East Gate Basin (near the Interstate Bridge) by private firms for filling docks. Permits from the Secretary of War were given for this purpose, and the work was done under the supervision of this office. For a time no special attention was given to the manner of dredging the sand, and many shoals were left by the dredge, but during the last two years the work has been laid out and carefully inspected by this office, the cost of inspection being paid by the owners of the dredge, and a deep clean bottom made with not less than 20 feet. No maximum limit was placed on the depth, and much of the bottom is about 30 feet. In this way about 90 acres have been dredged over, and about 850,000 yards removed, without cost to the United States.

With the approval of the Chief of Engineers an emergency contract was entered into June 24, 1908, for dredging out the shoals in the above-mentioned area, with the Zenith Dredge Company, at 12 cents per yard, and work on same commenced June 25 and is now in progress. The amount dredged in the month of June was 11,043 yards. The total amount required to be dredged under the contract is estimated at about 100,000 yards. The contract time for completing is October 31, 1908, but it is likely to be completed much sooner.

The result of this dredging will be to give more room for vessels to approach the Interstate Bridge with an easier turn, and avoid much of the danger of collision with the bridge. It will thus be of much use to navigation.

Cross channel.—Under Government permission and supervision, the Duluth, Missabe and Northern Railway Company and the Pittsburgh Steamship Company have dredged a deep channel across the flats of St. Louis Bay from the North channel at the Missabe ore docks to the South channel near the Pittsburgh coal dock No. 6.

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The channel was commenced in November, 1905, and completed about August 1, 1907. It is marked by the United States Light-House Establishment. The channel is public and open to the use of all vessels. The object of its construction was to facilitate the ore shipments from the Missabe docks, and also to enable down-bound vessels to approach the Interstate Bridge more nearly at right angles to the direction of the bridge, avoiding the sharp turn necessary when approaching from the North channel, and thereby lessening the danger of collision with the bridge piers.

A survey of the new channel, made by this office in December, 1907, shows a depth of 20 feet or more, except for a few small lumps having a fraction of a foot less. The bottom is rather stiff mud. The least width of 20-foot water is 250 feet, at its mid length. From that point it widens out to the junctions with the North and South channels, so as to provide easy turns from one channel into another.

Superior entry.—The construction of breakwaters and revetments at this entrance in accordance with the new project approved by the Secretary of War April 5, 1907, has been in progress during the past fiscal year. An outline of this project was given in my Annual Report for 1907, Appendix J J, page 1833, to which attention is invited.

Concrete revetments.—At the beginning of the year the excavation of a trench for the north concrete revetment pier was in progress. This was continued for several hundred feet into Minnesota Point, and then followed the construction that year of 400 linear feet of the concrete revetment, beginning at the inner or harbor end. The plan of this construction is the same as that of the south revetment, which was built in 1903–1906 and fully described in the Annual Report of the Chief of Engineers for 1904, Appendix A A A, "Technical details," page 3779. This portion was built between the dates of July 30 and September 18, 1907, and 4,898 yards of concrete were placed.

The concrete was mixed on the south side of the channel, where the plant for the south revetment had been erected and the material was stored, and was transported across the channel on a scow, which was provided with track for a tramway, on which the cars carrying the concrete buckets were run. A small locomotive handled the cars on the south side and another locomotive on the north side.

A protection dike of close-driven piles has been built to inclose the site of the north revetment in the lake during the work. The trench for the revetment has been continued into the lake the present season, the excavation being done by the hydraulic dredge *Ohio*, of the Great Lakes Dredge and Dock Company, at a price of $35 per hour. Bearing piles have been driven for a distance of 100 feet of this extension and cut off at 18 feet below low water, and a trestle and track has been built for transporting concrete and setting molds. The placing of concrete in the revetment extension is about to be commenced. Cement testing has been continued in the laboratory throughout the year.

Breakwater construction.—Proposals for building a portion of the rubble mound of the north breakwater were received August 15, 1907, and award of contract made to the Great Lakes Dredge and Dock

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Company for furnishing and placing the rock at a price of
ton. Following are extracts from the specifications:

The rubble mound is to be built to the height of 8 feet above the refer
which is low-water datum, and is to have a width of 48 feet at the refe
Below the reference plane the mound is to have slopes of 1½ horizontal to 1 v
The stone used in this work must be of igneous origin, hard durable roc
weigh not less than 170 pounds per cubic foot, generally angular in shape.
imum weight of any one piece will not be required to exceed 10 tons
dimension of the 10-ton facing stones to be not less than one-fourth the great
The core or inner part of the rubble mound may be composed of r
stone. The facing or covering must be composed of stones weighing not
tons each. The facing stones must cover the entire superfices of the bre
tending from the foot of slopes at lake bottom upward and over the top
water.
* * * The weight will be determined by water displacement, allowin
for 1 cubic foot of water.

The length of this rubble mound is to be 3,400 feet, and
of water is from 5 to 29 feet at low water.

Proposals for building this mound had previously be
(May 24, 1907), in which it was specified that the size of ro
core was to be not less than 500 pounds and a portion of th
to be of stones not less than 20 tons each. No bids were rec

The delivery of rock under the present contract was c
May 23, 1908, and up to June 30, 1908, 8,683 tons had be
The rock is a granite obtained from a quarry in the western
city of Duluth. It is hauled 2 miles by rail to a wharf in t
there transferred to a derrick scow, and transported 8 miles
to the site of the work. The larger pieces are placed wit
and the smaller pieces thrown off by hand. About 120,00
be placed under this contract. The estimated total amou
required for the north mound is 242,000 tons.

The Government derrick scow, with a grapple, has been e
excavating riprap from the base of the old piers and placin
in the rubble mound of the south breakwater. The amou
rock placed during the past year was 8,492 tons. During
vious year 2,000 tons had been placed, making 10,492 ton
This rock has built the mound above the water surface fo
distance.

Seaward end of breakwaters.—The construction of the ti
concrete piers which will form the 450 feet of the seaward e
breakwater was begun the present season by the method of l
and purchase of materials. The substructure will consist
cribs filled with rock with pile foundation. The superstru
be of concrete, the lower portion consisting of 10-ton footi
placed with a derrick, and the upper portion of large monolit
built in place. The construction will quite closely follow th
the Duluth Canal piers, of which drawings are shown in th
Reports of the Chief of Engineers, 1898, Appendix H H, p
1899, Appendix I I, p. 2702, and 1901, Appendix K K, pa
2850, 2858.

The width of the cribs is considerably greater than at D
instead of 24 feet), on account of greater exposure owing to t
tion with respect to the direction of storms. The depth of
will be 29 to 35 feet, which is greater than at Duluth, where t
was 21 feet. The cribs will be built in lengths of generally
The pierhead cribs are 40 feet wide. The cribs are being co

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at a yard fitted up for this purpose near the harbor end of the north concrete revetment. A framing mill has been built and equipped with a gaining machine and a dovetailing machine, both built at the Lake Shore Iron Works, Marquette, Mich., also with an air compressor for the operation of pneumatic augers. The cribs are built in the water, the bottom being given a temporary support by means of cross beams which are raised and lowered by screws. The framing machines do the work rapidly and well.

The timber is mostly Pacific coast fir, of which about 4,000,000 feet have been received for use in cribs and accessory works. The greater part of this timber was purchased in July, 1907, at a price of $16.70 at the coast. The freight on this was $6.40 per thousand, this being one-half the regular rate on account of transportation over a land-grant road. Some oak timber is also used. The work of framing was commenced April 21, 1908. On June 30 three cribs were completed and three more were in different stages of construction.

Concrete footing blocks are being constructed in the yard on south side of the channel, and 184 are completed to date.

The ground plan of the existing and proposed improvements at the Superior entry, including a cross section of the rubble mound breakwater, are shown on a single sheet herewith, to which attention is invited.

Steel tug.—There is now being constructed, mainly for use on the Superior entry work, a steel tug of following dimensions: Length over all, 85½ feet, length between perpendiculars 74½, beam 21, depth 11½. The Racine Boat Manufacturing Company, of Muskegon, Mich., contractors. Contract price is $35,950. The tug is now about 75 per cent completed.

Parking grounds at Duluth Canal.—The improvement of these grounds has been continued during the past year and completed the present season. It included the following items: Grading, surfacing with black soil and seeding, building cement walks, paving with sandstone blocks the spillway or area between the front and rear sea walls, water service for sprinkling lawn in the south park, and the building of a sewer manhole in the north park. Also rebuilding 115 linear feet of concrete park wall west of Lake avenue in south park, repairs to vessel landing at north park, protecting the foundation of the park wall adjoining the harbor in north park by riprap, and the cutting of an additional culvert through the concrete outer sea wall, north park. The cost of the foregoing work, which was done by hired labor and purchase of materials, was $4,802.

Maintenance of canal piers, etc.—Additional riprap was placed behind the piers, mainly for the purpose of stiffening the cribs forming the substructure, which by their elasticity had shown some vibration during storms which resulted in the spawling off of pieces of concrete in the superstructure at the joints between the monolithic blocks, and also for the purpose of filling up several points where the bottom had scoured away to a depth of 1 or 2 feet below the cribs. This riprap was placed by Whitney Brothers Company, under contract, during the month of June, 1908. Amount was 3,165.75 tons, at $1.50 per ton, or $4,748.63. The rock was granite and trap, from the north shore, mostly in large pieces, up to 100 cubic feet or more. About 600 linear feet of the north pier was thus strengthened, building up an embankment to about 10 feet of the water surface and

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about 250 feet of the south pier. The rock was placed on the rear side and not in the channel. Repairs have been made to the breaks in the concrete by filling out with new concrete and securing same by iron dowels.

Settlement of piers.—Spirit levels taken in February, 1908, over the concrete superstructure of the Duluth Canal piers shows an average settlement of 0.077 foot, or less than 1 inch, since the levels of June, 1901, which were reported in the Annual Report of the Chief of Engineers, 1901, Appendix K K, pages 2858–2862.

Culverts.—By request of Maj. Charles Keller, Corps of Engineers, and at the expense of the Light-House Establishment, five culverts were cut through the south parapet of the south pier, for the purpose of rapidly clearing the promenade of water at times when waves overtop the parapets during severe storms, and thus enabling the light keepers to walk out to the light and fog signal. The keepers have used the gallery heretofore, but that is occasionally nearly filled with water during the severest storms, and not passable. These culverts were each 1 by 5 feet in their least area, with a large flare at the inner end for the free entrance of water. They were spaced 200 feet apart. No storms have occurred to test their capacity since cutting them.

Damage to crib.—An examination of the canal piers with the aid of a diver on July 16, 1907, disclosed a hole broken through the crib wall on the south cutwater face of the north pierhead, below the steel plate protection, undoubtedly caused by the steamer *Mataafa* when she struck the pier November 28, 1905, although an examination of the upper portion of the crib soon after the accident showed no marks on the steel plating.

The following facts are reported by Assistant Engineer Darling:

The 24-inch wall of pine timber was broken through to the pockets for an area of about 7 feet vertically by 10 feet horizontally. The steel plates were uninjured. These consist of a double thickness of 1-inch plates riveted together and extending 7 feet down from the top of the crib, backed by 24 inches of oak timbers. The concrete superstructure was scarred some but not broken. The concrete is 2 feet back from the face of the crib. The pierhead did not indicate disturbance, or at least any permanent displacement. The vessel was of steel, and her bow was crushed from top to bottom and bent to one side by the collision. Her forefoot showed the effect of striking the riprap, which at that point was about 17 feet below low water. Evidently while the portion of the bow in contact with the armor plates was yielding, the lower portion entered the unprotected timber.

For a complete protection of the crib from such blows the protective plates should have been extended farther down on the face of the cutwater.

The repair of this damage would be difficult, and it was thought inadvisable to undertake it at present. The crib at the cutwater is subdivided into numerous small compartments or pockets by solid bulkheads and there is plenty of strength remaining to support the superstructure and resist any ordinary blow from a vessel. Waves are not likely to enlarge the opening and but little of the rock filling can escape. If there should be another similar collision, in exactly the same place on the pier, the vessel's bow would probably be crushed about the same as before, while the crib would not suffer much additional injury. It is questionable whether it would be advisable to repair this break without providing additional protection to the remaining surface of the walls of the cutwaters below the present armor plates. This would be so expensive by any method yet considered that it may be better to take the rare chance for the occurrence of another such collision.

Interstate bridge.—The work of rebuilding the wrecked draw span is still in progress, and the indications are that it will be completed and in operation some time during the month of July, 1908.

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The draw span, which is now standing over the protection pier, was struck by the steamer *Wilpen* June 12, 1908, and damaged slightly.

The enlargement of the East Gate Basin, previously described in this report, will enable vessels approaching the bridge from Superior Bay to make a longer and easier turn, and avoid much of the present danger of striking the bridge.

The litigation on account of the accident to this bridge on August 11, 1906, briefly stated, has been as follows: Soon after the accident the bridge company filed a libel against the steamer *Troy*, her boilers, engines, etc., in the district court for the western district of Wisconsin, in admiralty, claiming large damages. The Western Transit Company, owner of the *Troy*, filed exceptions, which were sustained by the court, and the decision rendered was to the effect that redress can not be afforded in admiralty for injuries inflicted by a colliding vessel upon the draw of a bridge over a navigable stream, and to its center pier protection.

An appeal was submitted to the United States Supreme Court by the bridge company December 20, 1907, and a decision of this, the highest court, was rendered February 24, 1908, affirming the decree of the district court.

No further action in this matter has been taken to the knowledge of this office.

Northern Pacific bridge, St. Louis Bay.—The work of reconstruction has been in progress during the past year. Five concrete piers have been built and two remain to be built. The two old draw spans have been taken to pieces this season and removed. On the date of June 30, 1908, the two new draw spans were so nearly completed that it was announced that the bridge would be in operation in about a week.

The Wisconsin draw span is double tracked. It crosses the channel at less than a right angle, and is 479 feet long, making it one of the largest draw spans in the country. The Minnesota draw is built only for a single track, and is 425 feet long. The clear height of the Minnesota span above low water datum is 14.7 feet, and the height of the Wisconsin span is 13.7 feet. Each draw is operated by an electric motor, the current being supplied by a storage battery which is charged by a gasoline engine. A second and larger gasoline engine is kept in reserve for swinging the draw directly. In case one or both of these engines should fail, the current can be switched in from the other draw span. A compressed air whistle will be used for giving the return signals to vessels required by the rules.

The time for completing the reconstruction of this bridge, originally set for the opening of navigation in 1908, has been extended by the Secretary of War to the opening of navigation in the spring of 1909, owing to the impossibility of completing the work by the former date. The new rafting span close to the Minnesota shore will be built during the coming winter. The site for it is now occupied by a temporary trestle. The two remaining bridge piers will also be built next winter.

The completion of the new draw spans with the wide openings of 375 feet each, and with the new positions of the spans, which are further from the shore and give easier turns between this bridge and the Interstate bridge, is certain to facilitate navigation and reduce the number of collisions of vessels with the bridges, which has been too great in recent years.

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Extension of Duluth Harbor Basin.—An act of Congress approved May 28, 1908, provides:

That the Secretary of War may, in his discretion, apply the whole or any part of the unexpended balance of the amount heretofore appropriated for the improvement of the Duluth-Superior Harbor, Minnesota, to dredging inside the Duluth entrance thereto, as recommended in House Document Numbered Two hundred and twenty-one, Sixtieth Congress, first session.

The recommendation referred to in Document 221 is contained in paragraph 5, page 7, of the report of a Board of Engineers dated June 20, 1907, and reads as follows:

The board deems it advisable that the inner basin be enlarged by dredging to a depth of 22 feet, low-water datum, the area marked on the tracing submitted herewith, and that the Minnesota Point harbor lines be changed to conform thereto. This dredging will increase the anchorage area of the Duluth Basin from 171 acres to 380 acres, will also facilitate the movement of large ships between the Duluth Canal and the entrance to St. Louis Bay. The estimated quantity of material to be removed to accomplish this enlargement is 4,590,000 cubic yards, measured in place, the estimated cost of which is $550,800.

A project submitted by me May 26, 1908, and approved by the Chief of Engineers June 1, 1908, contains the following clause:

4. * * * the sum of $200,000 could be profitably applied to the purpose named from present available funds. It is proposed to expend this sum in dredging as much of the area recommended by the Board of Engineers as the prices to be obtained will permit, the dredging to commence at the present southerly limits of the Duluth Harbor Basin and progress southward. * * *

Specifications for this work provide for a minimum depth of 22 feet. Bids for this work were duly opened June 30, 1908. The lowest bid, 10½ cents, submitted by the Great Lakes Dredge and Dock Company of Chicago, was reasonable and recommended for acceptance.

A plan for changing the Minnesota Point harbor line, having reference to the foregoing proposed dredging, was submitted by me June 1, 1908, with map. A public hearing was directed by the Chief of Engineers, and this was held June 20, 1908, after extensive notices through the local press and by circular letters. A fair number of interested persons was present, and letters were received from others. A report of the proceedings, with my recommendations, was submitted to the Chief of Engineers under date of June 22, 1908.

Harbor patrol.—A systematic supervision of the harbor has been in operation since August 22, 1906, by Mr. H. C. Bellinger, harbor inspector. The duties of the inspector are to enforce the rules and regulations pertaining to the harbor, with special reference to injurious deposits, encroachments by wharf construction, speed of vessels, obstruction of channels by rafts, assignment of position to vessels in the anchorage basin, etc., and the securing of evidence in case of violations. The U. S. steam launch *Tangent* is used for this purpose. This launch is 42 feet long, has a small cabin, without accommodations, and is not just what is needed, but is economical in expense and can be used for the present. The crew numbers only two, a pilot and a steam engineer. Effective work is accomplished by this inspection.

Commerce.—The system of vessel reports which was inaugurated in 1895 has been kept up, and the commercial statistics accompany this report. These are as accurate as is practically possible to make them, being compiled from the individual reports of each trip of every vessel, in or out, made directly to this office.

These data are considered of much value by the public, as evidenced by the great demand upon this office for copies from railroad corpora-

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tions, vessel agencies, commercial organizations, publishers of trade and technical journals, and others, a demand which is increasing yearly. The reports are mimeographed in this office for gratuitous distribution.

It is worthy of notice that the freight tonnage for the calendar year 1907 shows an increase of 19¼ per cent over that of the previous year, and that it amounts to 60 per cent of the freight passing the Sault locks in the same year.

The statistics given herewith are for the calendar year 1907. Owing to financial and industrial conditions at present prevailing the vessel commerce for the current year, 1908, promises to be lighter, as compared with last year. The iron-ore shipments from Duluth and Superior for the portion of this season to July 1 are much less than for the same period in 1907, and a similar decrease has occurred at the other ore-shipping ports on Lake Superior. Coal shipments also show a large decrease.

Private improvements.—Among the larger of the private improvements on this harbor completed during the year ending June 30, 1908, are the following:

Coal dock, by the Duluth, Missabe and Northern Railway Company on the north side of St. Louis Bay, Duluth, near the ore docks of that company. Size, 604 feet wide by 1,800 feet long. This will handle coal for the Duluth, Missabe and Northern Railroad and for the iron mines of the United States Steel Corporation on the Missabe Range.

Berwind-White coal dock, Superior, on the south side of St. Louis Bay, three-fourths of a mile west of the Northern Pacific bridge. Size, 455 feet wide by 1,200 feet long.

(The Cross channel, St. Louis Bay, has been described in another place.)

Among private improvements under construction June 30, 1908, are:

Pennsylvania and Reading coal dock, Connors Point, Superior Bay, Superior. This will extend from the shore to the harbor line with a length of 1,157 feet and a width of 673 feet.

The Northern Cold Storage and Warehouse Company are erecting a cold-storage plant at the inner end of Slip No. 2, Superior Bay, Duluth. Building, 84 by 150 feet, with 7 stories. Capacity, 500,000 cubic feet, for storage purposes.

Wisconsin Central Railroad. Terminals in Duluth and Superior. Estimated cost two and one-half to three million dollars.

(The reconstruction of the Northern Pacific Railway bridge in St. Louis Bay has been described elsewhere in this report.)

Projected private improvements of magnitude include the following:

Wisconsin and Northern Minnesota Railway terminals. This road, which is a branch of the Soo Line and a part of the Canadian Pacific system, has purchased and condemned a right of way and terminal grounds in Duluth and Superior. Their passenger station in Duluth will be located at the foot of Twelfth avenue west.

Steel plant.—The United States Steel Corporation has decided to establish a steel plant on the westerly side of Spirit Lake, near New Duluth, at a cost of six to ten million dollars, as stated in my last annual report.

Losses by fire.—Two serious fires have occurred during the past year. One at Superior on the water front of St. Louis Bay, November

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8, 1907, destroyed 3 grain elevators, 2 flour mills, and other smaller buildings and plants. Loss estimated at two and one-half million dollars. No plans have been made for replacing these structures.

Elevator D and the Northern Pacific Railway freight warehouse No. 1 on Superior Bay, Duluth, were destroyed June 26, 1908, with a loss estimated at $700,000. It has been decided to build a new elevator in place of the one burned.

Money statement.

July 1, 1907, balance unexpended		$1,154,805.58
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$311,639.76	
For maintenance of improvement	80,430.10	
		392,069.86
July 1, 1908, balance unexpended		762,735.72
July 1, 1908, outstanding liabilities		56,130.47
July 1, 1908, balance available		706,605.25
July 1, 1908, amount covered by uncompleted contracts		285,000.00
Amount (estimated) required for completion of existing project		1,378,799.20
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$746,000.00	
For maintenance of improvement	51,000.00	
		797,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

HARBOR AT DULUTH, MINN., AND SUPERIOR, WIS.

June 3, 1896	$50,000.00	June 13, 1902	$200,000.00
June 4, 1897 (sundry civil act)	437,500.00	March 3, 1905	270,000.00
July 1, 1898 (sundry civil act)	770,138.00	June 30, 1906 (sundry civil act)	100,000.00
March 3, 1899 (sundry civil act)	300,000.00	March 2, 1907	725,000.00
June 6, 1900 (sundry civil act)	793,187.50	March 4, 1907 (sundry civil act)	200,000.00
March 3, 1901 (sundry civil act)	320,000.00	Miscellaneous receipts	2,667.50
June 28, 1902 (sundry civil act)	459,727.50	Total	4,628,220.50

The following statement shows the manner in which the appropriations have been expended since June 30, 1896. The amount expended under the different classes of work includes the cost of soundings, superintendence, buoying, and contingencies:

Dredging and maintenance	$2,317,941.05
Duluth Canal piers	650,000.00
Wisconsin Entry piers	747,732.54
Purchase of land	107,061.19
Vessel-yard construction	17,750.00
Engineer building	25,000.00
Total	3,865,484.78

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HARBOR AT DULUTH, MINN.

March 3, 1871	$60,000.00	August 2, 1882	$45,000.00
June 10, 1872	50,000.00	July 5, 1884	45,000.00
March 3, 1873 (allotted)	36,049.20	August 5, 1886	56,250.00
June 23, 1874	10,000.00	August 11, 1888	80,000.00
March 3, 1875	35,000.00	September 19, 1890	100,000.00
August 14, 1876	15,000.00	July 13, 1892	125,000.00
June 18, 1878	30,000.00	August 18, 1894	75,000.00
March 3, 1879	25,000.00		
June 14, 1880	25,000.00	Total	852,299.20
March 3, 1881	40,000.00		

The following statement shows the manner in which the appropriations have been expended. The amount expended under the different classes of work includes the cost of soundings, superintendence, buoying, and contingencies:

Total amount expended to June 30, 1897:	
Breakwater	$110,000.00
Dredging	644,638.55
Canal piers, etc	97,660.65
Total	852,299.20
Expended prior to present project:	
Breakwater	110,000.00
Canal piers, etc	45,698.33
Dredging	122,354.05
Total	278,052.38
Expended under the project adopted in 1881:	
Canal piers, etc	51,962.32
Dredging	522,284.50
Total	574,246.82

HARBOR AT SUPERIOR BAY AND ST. LOUIS BAY, WISCONSIN.

March 3, 1867	$63,000.00	March 3, 1881	$10,000.00
April 10, 1869	45,000.00	August 2, 1882	40,000.00
July 7, 1870	40,000.00	July 5, 1884	45,000.00
March 3, 1871	60,000.00	August 5, 1886	22,500.00
June 10, 1872	50,000.00	August 11, 1888	50,000.00
March 3, 1873 (allotted)	63,950.80	September 19, 1890	65,000.00
Allotted from appropriations for "Repairs of harbors on northern lakes"	5,433.00	July 13, 1892	70,000.00
		August 18, 1894	50,000.00
August 14, 1876	3,000.00	Total	695,883.80
June 18, 1878	3,000.00		
March 3, 1879	5,000.00	Aggregate	6,176,403.50
June 14, 1880	5,000.00		

EXPENDITURES.

Amount expended under original project, adopted in 1867	$258,000.00
Amount expended under project recommended by Board of Engineers in 1873	77,513.26
Amount expended under present project to June 30, 1897	360,370.54
Total	695,883.80

The following statement shows the manner in which the appropriations have been expended. The amount expended under the different classes of work includes the cost of examinations, soundings, superintendence, buoying, and contingencies.

Repairs and beach protection	$13,233.00
Construction and repair to piers	334,278.64
Dredging	348,372.16
Total	695,883.80

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LIST OF EXISTING CONTRACTS.

Contract was entered into with the Illinois Steel Company, of Chicago, Ill., dated January 30, 1903, approved by Chief of Engineers February 21, 1903, for furnishing 65,000 barrels of Portland cement for Superior entry piers, south side, at $2.17 per barrel, delivered in sacks (four sacks to the barrel), less 10 cents each for sacks returned; delivery to commence May 1, 1903, and be completed by October 15, 1904. Time of completion waived for a reasonable period by indorsement of the Chief of Engineers, dated October 4, 1904.

Contract was entered into with Great Lakes Dredge and Dock Company, of Chicago, Ill., dated August 31, 1907, approved by Chief of Engineers, September 10, 1907, for building north rubble mound breakwater at Superior entry, Wisconsin. Funds available, about $193,250, including contingencies, inspection, etc. Price, $1.60 per ton for stone placed in the work. Commence by September 27, 1907. Complete by September 17, 1909.

Contract was entered into with Racine Boat Manufacturing Company, of Muskegon, Mich., for building a steel tug for Duluth-Superior Harbor, dated July 17, 1907, approved August 2, 1907. Price, $35,950. Commence by August 25, 1907, complete by May 1, 1908. Time limit waived for a reasonable period by indorsement of the Chief of Engineers dated April 18, 1908.

Contract was entered into with Great Lakes Dredge and Dock Company, of Chicago, dated April 24, 1908, approved May 6, 1908, for dredge hire at Superior entry, at $25 per hour for dipper dredge with accompanying plant and $35 per hour for hydraulic dredge. Commence by May 20, 1908, Complete by July 20, 1908.

Contract was entered into with Belmont Iron Works, of Philadelphia, for 633,516 pounds of steel plate for Superior entry, dated May 5, 1908, approved May 27, 1908. Price, 2 15-100 cents per pound. Commence by June 15, 1908. Complete by September 15, 1908.

Emergency contract was entered into June 24, 1908, with Zenith Dredge Company, of Duluth, for dredging about 100,000 yards of material (shoals) from East Gate Basin, Duluth-Superior Harbor, at 12 cents per yard. Commence promptly and complete by October 31, 1908.

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Duluth, Minn., for the calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Net registered tonnage.
Propellers	4,183	3,935	8,118	21,[illegible]
Tow barges	341	328	669	[illegible]
Total	4,524	4,263	8,787	21,[illegible]

Net registered tonnage entered, 11,259,112; departed, 10,613,946.
Number of passengers arriving, 27,091; departing, 26,319; total, 53,410.

Arrivals and departures for each month with net registered tonnage.

Month.	Arrivals.	Departures.	Total.	Tonnage.
January	3	4	7	1,[illegible]
March	1	.....	1	[illegible]
April	139	87	226	[illegible]
May	594	647	1,241	3,240,917
June	560	636	1,196	3,178,[illegible]
July	665	547	1,212	2,375,[illegible]
August	632	597	1,229	2,[illegible]
September	609	523	1,132	2,[illegible]
October	678	651	1,326	3,[illegible]
November	533	494	1,032	2,[illegible]
December	108	77	185	[illegible]
Total	4,524	4,263	8,787	21,[illegible]

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Comparative statement for calendar years 1906 and 1907.

Year.	Arrivals.	Departures.	Total.	Registered tonnage.	Average tonnage.
1906	4,646	4,669	a 9,315	20,492,890	b 2,384
1907	4,524	4,263	c 8,787	21,873,058	b 2,948

a Steam, 8,383; tow, 932. b Exclusive of tugs. c Steam, 8,142; tow, 645.

Arrivals and departures of vessels at Superior, Wis., for the calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Net registered tonnage.
Propellers	2,486	2,439	4,925	13,231,886
Tow barges	103	127	230	469,831
Total	2,589	2,566	5,155	13,701,717

Net registered tonnage entered, 6,700,760; departed, 7,000,957.

Number of passengers:

Arriving	1,311
Departing	1,168
Total	2,479

Arrivals and departures for each month, with net registered tonnage.

Month.	Arrivals.	Departures.	Total.	Tonnage.
April	57	79	136	418,070
May	359	369	728	1,887,778
June	380	400	780	1,916,433
July	379	317	696	1,714,035
August	364	384	748	2,016,216
September	361	345	706	1,814,715
October	360	380	740	2,062,306
November	277	257	534	1,516,006
December	52	35	87	356,038
Total	2,589	2,566	5,155	13,701,717

Comparative statement for calendar years 1906 and 1907.

Year.	Arrivals.	Departures.	Total.	Registered tonnage.	Average.
1906	2,780	2,759	a 5,539	12,349,461	b 2,473
1907	2,589	2,566	c 5,155	13,701,717	b 3,063

a Steam, 5,157; tow, 382. b Exclusive of tugs. c Steam, 4,925; tow, 230.

Receipts and shipments, with valuations, for 1907, Duluth and Superior combined.

Description of cargo.	Quantity.	Unit price.	Valuation.
RECEIPTS.			
Cement ..... barrels..	168,148	$1.65	$277,444
Coal, hard ..... tons..	1,169,027	6.25	7,306,419
Coal, soft ..... do....	5,868,152	3.12	18,308,635
Fish ..... do....	2,278	80.00	182,240
General merchandise ..... do....	242,481	210.00	50,921,010
Gravel ..... cubic yards..	41,851	1.00	41,851
Limestone ..... tons..	61,148	1.30	79,492
Logs ..... M feet..	11,028	15.00	165,420
Lumber ..... do....	4,167	20.00	83,340
Machinery ..... tons..	2,098	375.00	786,750
Manufactured iron ..... do....	196,997	78.00	15,365,766
Oils, kerosene, etc ..... barrels..	122,591	6.50	796,842

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Receipts and shipments, with valuations, for 1907, Duluth and Superior combined—Continued.

Description of cargo.	Quantity.	Unit price.	Valuation.
Oils, lubricating ..... barrels..	4,687	$10.00	$46,870
Piles ..... number..	30,855	4.20	129,591
Poles ..... do....	146,234	2.10	307,091
Posts ..... do....	95,291	.65	61,939
Salt ..... barrels..	412,967	.75	309,725
Sand ..... cubic yards..	48,359	.65	31,433
Stone ..... tons..	17,038	5.75	97,969
Ties ..... number..	96,357	.65	62,632
Unclassified ..... tons..	1,824	.....	340,380
Total	.....	.....	95,702,839
SHIPMENTS.			
Copper ..... tons..	8,543	460.00	3,929,780
Flax ..... bushels..	16,321,158	1.20	19,585,389
Flour ..... barrels..	5,036,869	5.00	25,184,345
General merchandise ..... tons..	49,139	210.00	10,319,190
Grains (other than wheat and flax) ..... bushels..	12,975,728	.79	10,250,825
Iron ore ..... tons..	23,590,969	2.67	62,987,887
Lath ..... M..	21,527	3.75	80,727
Lumber ..... M feet..	346,540	20.00	6,930,800
Manufactured iron ..... tons..	194	78.00	15,132
Shingles ..... do....	52,151	30.00	1,564,530
Unclassified ..... do....	7,984	.....	714,270
Wheat ..... bushels..	48,298,224	.98	47,332,260
Wool ..... tons..	4,442	660.00	2,931,720
Total	.....	.....	191,826,855
Grand total	.....	.....	287,529,694

Total number of tons received, 7,840,023; total number of tons shipped, 26,946,682; total number of tons received and shipped, 34,786,705.

The storage capacity of the Duluth-Superior elevator system is 30,150,000 bushels; that of Duluth elevators is 14,800,000, and of Superior 15,350,000.

The shipments of wheat from Duluth-Superior Harbor for the year were 48,298,224 bushels, or 1,448,947 tons.

The average net registered tonnage, exclusive of tugs, for Duluth-Superior Harbor in 1907 was 3,002—a gain of 573.

IMPORTS AND DUTIES DURING THE CALENDAR YEAR 1907.

Imports, $124,906; duties, $37,883.48; value of domestic exports, $8,627,681.

NEW LINES OF TRANSPORTATION FOR 1908.

Aurania Transit Company, 1 steamer; Boland & Cornelius, 1 steamer; Christopher Steamship Company, 1 steamer; Detroit Steamship Company, 1 steamer; Empress Transportation Company, 1 steamer; Frontier Steamship Company, 1 steamer; Inland Navigation Company, 3 steamers; Mahoning Steamship Company, 1 steamer; Mutual Steamship Company, 3 steamers; Standard Steamship Company, 1 steamer; Triton Steamship Company, 1 steamer; Wilkinson Steamship Company, 1 steamer.

ADDITIONS TO EXISTING LINES FOR 1908.

Acme Steamship Company, 1 steamer; Erie and Western Transit Company, 1 steamer; W. A. & A. H. Hawgood, 10 steamers; Hutchinson & Co., 2 steamers; Jenkins Steamship Company, 1 steamer; Mutual Transit Company, 3 steamers; Nessen Transportation Company, 1 steamer.

COMMERCE OF DULUTH-SUPERIOR HARBOR FOR CALENDAR YEAR 1907.

[All tons in this report are of 2,000 pounds.]

Total vessel freight received and shipped, 34,786,705 tons, valued at $287,529,694.

Increase in freight tonnage over 1890, 1,121 per cent.

Increase in freight tonnage during the past year, 19.25 per cent.

It is impossible to give precise figures of the marine commerce of the principal ports of the United States for comparison with Duluth-Superior Harbor, for the reason

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that at ocean ports of the United States, as well as of foreign countries, no record of domestic tonnage is kept at the custom-houses or by any other agency, so far as known, whereas on the Great Lakes records are kept of total marine commerce, both foreign and domestic. In the principal ocean ports of the United States the tonnage of the local and coastwise (domestic) marine commerce is several times greater than that of the foreign. Any comparison, therefore, of the relative marine commerce of lake and ocean ports, based solely upon custom-house records, is, for the reason stated, incorrect and misleading.

However, the custom-house records of the marine commerce of ports on the Great Lakes are very incomplete for the reason that no account is kept of the movement of freight or passage of vessels between subports of a district, and as, in the case of the Duluth and Superior customs districts on Lake Superior, numerous subports are included which do an important business with each other, none of which is required to be reported to the custom-houses, a large amount of the commerce of any particular port is unknown to the custom-houses. Furthermore, a vessel may enter or clear from the port or any subport of a district, report its cargo, and subsequently load or unload the whole or any part of its cargo at any other subport of the same district without further action at the custom-house.

The statistics of the marine commerce of this port are obtained as follows: The master or clerk of every vessel entering or departing from Duluth-Superior Harbor makes a report to this office covering the name of the vessel, the net registered tonnage of same, whether light or loaded, and, if loaded, what the cargo consists of, whether, in entering, the vessel is destined for Duluth or Superior, and whether, in departing, the vessel was loaded at Duluth or Superior, etc., all as provided by the act of Congress approved February 21, 1891. These reports, so far as the arrival and departure of vessels is concerned, are then checked against the lists of vessels arriving at and departing from the harbor, furnished by the watchmen employed by this office, and stationed at the entrances to the harbor, which lists have previously been entered in record books provided for that purpose. Should any vessel master fail to make his report a special request is made for it. The vessel reports are also checked against the iron-ore dock reports, the board of trade records of grain shipments, etc.

Considering the mean monthly freight movement during the season of navigation, Duluth-Superior Harbor practically stands next to New York.

REMARKS ON THE COMMERCE OF DULUTH-SUPERIOR HARBOR FOR 1907.

Vessel tonnage.—Net registered tonnage is used, and is obtained from vessel reports made to this office, and checked by official marine directories.

Valuations.—Freight valuations were obtained from the various trade journals, commercial records, and the principal wholesale dealers, and are based on average wholesale prices on board vessels for exports, and landed on wharves for imports.

Hard coal shows an increase of 280,455 tons over 1906.

Soft coal shows an increase of 1,432,184 tons over 1906.

Wheat and other grains show a decrease of 6,239,442 bushels, with an increase in valuation of $11,916,161 over 1906, due to the higher prices prevailing for all kinds of grain in 1907.

Iron ore shows an increase of 4,222,783 tons over 1906.

The total number of passengers arriving and departing was 55,880.

Average net registered tonnage recorded at Duluth, exclusive of tugs, 2,948.

Vessels recorded at Duluth Canal were—entering, 4,030; departing, 3,924; total, 7,954.

Vessels recorded at Wisconsin entry were—entering, 1,480; departing, 1,307; total, 2,782.

Average number of tons of cargo received per day during the season of navigation at Duluth and Superior, 33,504.

Average net registered tonnage recorded at Superior, exclusive of tugs, 3,055.

Average number of tons of cargo shipped per day, during the season of navigation, from Duluth and Superior, 115,156.

The navigation season covered a period of 234 days. This is reckoned from the first departure or arrival to the last departure or arrival to or from the lower lakes. The open season for Duluth-Superior Harbor to and from Lake Superior ports only, was much longer, as some local boats ran all but two months of the year.

Duluth Canal.—First departure for lower lakes, April 22. First boat entered from lower lakes, April 26.

Last boat departed for lower lakes December 12. Last boat arrived from lower lakes December 12.

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North shore boats were running at close of calendar year.
Wisconsin entry.—First boat arrived from lower lakes April 28.
First boat departed for lower lakes April 22.
Last boat arrived from lower lakes December 7.
Last boat departed for lower lakes December 3.

The largest cargo entering Duluth-Superior Harbor was brought in by the steamer *M. W. Mills*, and consisted of 12,680 short tons of soft coal. Several cargoes of nearly the same size were brought in by other boats.

The largest cargo departing from the harbor was carried by the steamer *Wm. B. Kerr*, and consisted of 13,712 short tons of iron ore. The largest cargo of grain was carried out by the steamer *L. S. De Graff*, consisting of 422,000 bushels of wheat, weighing 12,660 tons.

There is a large increase in tonnage, but a falling off in the number of arrivals and departures, showing clearly how fast the smaller craft is being replaced by larger.

The first boat to enter this harbor from the lower lakes arrived on April 26, being the first of a fleet of 136 boats which had been imprisoned in the ice in White Fish Bay at the eastern end of the lake, all of which entered this harbor before the close of the month.

JJ 4.

IMPROVEMENT OF HARBOR AT PORT WING, WISCONSIN.

For a detailed description of this harbor see the Annual Reports of the Chief of Engineers, United States Army, for the years 1900–1907. The estimate of cost of original project is increased to $56,539 on account of underestimate of dredging in the first place. This was authorized by the Chief of Engineers, June 18, 1908.

Work done during year: A revetment or wing wall was built, 100 feet long, starting at the inner end of the west pier and running at an angle of 45° with the direction of the pier in a southwesterly direction, for the purpose of preventing the sea from washing around the end of the pier and carrying sand into the channel. This revetment consisted of two rows of piles 7 feet apart between centers and the piles in each row 2 feet between centers. Driftwood and logs were filled in between the piles and rock ballast placed on the filling. No wale timbers or ties were used.

Repairs were made to the west pier by refilling with rock eight of the pockets where the original filling had settled.

The foregoing work was done under contract by Whitney Brothers, between the dates of June 27 and July 16, 1907, at a contract cost of $1,588.55, of which $838 was for the revetment, an improvement, and $750.55 was for repairs. Unit prices were as follows: Piles, 18 feet long, $5.75 each, in place; driftwood filling, $8 per cord in place; and rock for filling, of sandstone rubble, $1.30 per ton in place.

Dredging was done to remove shoals by the Zenith Dredge Company, under contract, between the dates of July 15 and July 25, 1907, after which the dredge was transferred to the Ashland work. A survey discovered some shoals which had not been taken out, and further dredging was done by the Northern Dredge and Dock Company, of Duluth, under contract, on September 22, 1907. The amount of work done by the Zenith Dredge Company was 16,212 yards, at 17¼ cents per yard, $2,877.63. The work done by the Northern Dredge and Dock Company, twelve hours with a clam shell, at $20 per hour, $240.

The total cost of the foregoing contract was $4,706.18.

A survey made soon after the completion of the dredging showed a channel with least depth of 14 feet and width of 80 to 90 feet from

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the lake through the entrance to 100 feet inside the piers, at which point it narrowed up and connected with private dredging at a point about 200 feet from the piers.

Private dredging by the lumber company removed shoals for a distance of 700 feet farther up the river, along the lumber wharf, giving a depth of about 18 feet, but excessive rains caused further shoaling, and on September 27, 1907, a least depth of 12½ feet was found in the above-mentioned stretch of 700 feet.

Soundings taken April 22, 1908, showed no material change in the depth of the entrance channel since the dredging of the previous season.

Regarding present and prospective business, Mr. T. N. Okerstrom, lumber manufacturer at Port Wing, in reply to a request from this office for information, writes June 11, 1908:

* * * There is sufficient timber to supply and run two sawmills here for the next coming twenty years. I have but a small portion of it and still have five years' supply. I shall manufacture about 5,000,000 feet the present season, intending to cut about a like amount next year if nothing more serious occurs with our country's finances. At present there is no sale for lumber, but I am stacking it upon my dock.

* * * We have great forests of timber, and I now wish to give you figures on amount I know is here. We have at least 40,000,000 feet of oak, 10,000,000 feet of birch, 15,000,000 feet of pine and spruce, 75,000,000 feet of hemlock, 10,000,000 feet of ash, elm, and basswood.

In addition to above available stock, in Cook County, Minn., there is over 700,000,000 feet of good pine still growing, located directly across the lake from Port Wing, which can be towed here with less risk and expense than to either Duluth or Superior, and as good and even more practicable facilities to tow and handle any timber on the south shore than those cities afford.

* * * We also handle from 50,000 to 150,000 pieces of cedar poles and ties annually in this harbor. * * *

The Port Wing Quarry Company are working a large force of men now taking out brown sandstone. Reports from the manager, Mr. George Froney, show orders for 200,000 cubic feet. While other quarries are closed during the financial disturbance those people enjoy a steady increase in sales for their material. * * *

Revised estimate of cost.—Work under the approved project remaining uncompleted consists of the following:

Dredging through the entrance and in the turning slip to give full project dimensions, 67,000 yards, at 17 cents	$11,390
155 linear feet of pile revetment at inner end of east pier, at $12	1,860
Administration and contingencies, 15 per cent	1,987
Total	15,237

This sum added to the $41,302 already expended for improvement makes a total estimated cost for improvement under the present project of $56,539. This exceeds the original estimate ($44,992) by $11,547, and is owing in part to the necessity of stiffening the pile structure with an embankment of riprap at the rear, higher contract prices for the construction of the west pier than was estimated, and an underestimate of the amount of dredging required.

It is believed that the present and prospective commerce of this harbor justifies the appropriation of the sum of $15,237 for the completion of the project, and a sum of $5,000 for maintenance. These sums are accordingly recommended.

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Money statement.

July 1, 1907, balance unexpended	$4,978.05
June 30, 1908, amount expended during fiscal year for maintenance of improvement	4,977.71
July 1, 1908, balance unexpended	.34
Amount (estimated) required for completion of existing project	[a]15,237.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$15,237.00
For maintenance of improvement	5,000.00
	20,237.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

June 13, 1902	$25,000
March 3, 1905	19,992
March 2, 1907	2,000
Total	46,992

ABSTRACT OF CONTRACTS IN FORCE.

Contract dated May 18, 1907, with Zenith Dredge Company, of Duluth, for dredging shoals at the entrance channel. About 14,000 cubic yards at 17¾ cents per cubic yard. Approved by Chief of Engineers May 29, 1907. Work to begin after completion of dredging at Ashland, Wis., and to be completed by October 10, 1907.

Informal contract dated May 31, 1907, with Whitney Brothers Company, of Superior, Wis., for building revetment at the inner end of the west pier and repairs by rock filling in the west pier. Work to begin as soon as practicable, and be completed within one month, at the following prices: For 100 piles in place in the work, at $5.75 for each pile. For 50 cords of driftwood and logs for filling revetment, $8 per cord in place in the work. For 550 tons of rock ballast, $1.30 per ton in place. All quantities more or less.

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Port Wing, Wis., for the calendar year 1907.

	Arrived.	Cleared.	Total.	Estimated net registered tonnage.
Vessels	80	80	160	21,260

Passengers arriving, 254; departing, 253; total, 507.

[a] Authorized by Chief of Engineers June 18, 1908. E. D. 54980/21.

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Receipts and shipments of freight.

[Tons of 2,000 pounds.]

Receipts.	Tons.	Shipments.	Tons.
Miscellaneous merchandise	1,200	Lumber (3,800 000 feet)	5,700
		Building stone	25,000
		Sand and gravel	60,000
		Railroad ties (45 000)	4,500
		Poles and posts (140 M)	10,500
		Miscellaneous merchandise	71
Total	1,200	Total	105,771

Total receipts and shipments, 106,971; increase, 78,360, equal to 274 per cent.
Total valuation, $973,660; increase over 1906, $628,212, or 182 per cent.
Owing to the shoal water during the early part of the season this harbor was not sought by vessels as a harbor of refuge.

J J 5.

IMPROVEMENT OF HARBOR AT ASHLAND, WISCONSIN.

For a detailed description of this harbor see earlier annual reports, also Bulletin No. 18, page 40, issued by the United States Lake Survey. During the year ending June 30, 1908, work was done by the United States as follows:

Dredging under contract with Zenith Dredge Company extended the Government channel 1,440 feet westward, with a width of 100 feet and a depth of 20 feet or more at mean low water. This channel now reaches a point in front of the Lake Superior Iron and Chemical Company's wharf, about 70 feet east of the east face of the wharf prolonged, this being the most westerly wharf so far constructed in this harbor. It was formerly known as the Ashland Iron and Steel Company. This work of improvement removed 51,764 yards, at the price of 14¾ cents, making the contract cost $7,635.19.

Under the same contract shoals were removed from the older portions of the channel, affording a depth of 20 feet for the entire length. The amount of material removed was 51,418 yards, and the contract cost at 14¾ cents was $7,584.16. The total amount of dredging was 103,182 yards, at a contract cost of $15,219.35. The work was done between the dates of July 29, 1907, and November 15, 1907.

The total length of the Government dredged channel along the harbor front is now about 5,760 feet. Opposite Beaser avenue there is a turn in the channel, so that the westerly 1,500 feet of its length has a direction about 22° westward of the line of the easterly portion. At the turn the channel is 150 feet out from the harbor line, the west end of the channel comes up to the harbor line, and at the east end (near the Commercial dock) it is 110 feet out from the harbor line. The channel is not marked in any way at present. A survey of the channel was made by this office in December, 1907, through the ice, and the results mapped. The above description is based upon this survey.

Easterly from the east end of the dredged channel the natural depth of water is sufficient for the present needs of commerce. The

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least depth in the bay in front of the harbor line from the Commercial dock eastward to the Chicago and Northwestern ore docks is a little more than 19 feet at mean low water.

Soundings were taken by this office, December, 1907, in the slips alongside the principal active wharves of Ashland Harbor, which have been deepened by private dredging, and results mapped.

The work of strengthening the breakwater by a revetment of riprap, which was commenced in 1903, has been continued during the past fiscal year. The form of this revetment is shown by a diagram printed in the Annual Report for 1905, page 1992. At the beginning of the last fiscal year the George A. Wieland contract was in progress, and was completed August 17, 1907. During the months of July and August, 1907, this contractor placed 8,669 tons, covering a linear distance of 290 feet, between stations 4710 and 5000. (Stations are distances in feet from the east end of the breakwater.) The total amount delivered under the Wieland contract was 53,159 tons, at a price of 79 cents, amounting to $41,995.61. It covered a distance of 2,213 feet.

This breakwater, which is now being covered with rock, is not of the same width throughout. It has a width of 20 feet for a distance of 4,600 feet, or five-eighths of the total length, and a width of 30 feet for the remaining 2,763 feet. The 20-foot width was built first, in the year 1889, and was in a somewhat worse state of decay than the remainder, which was built in 1891–1893. The reenforcement of this portion was accordingly commenced first, under the Donald & Co. contract, June 6, 1903; the Wieland contract was entirely on this portion, and it was completed under the A. Sang contract October 26, 1907.

The revetment of the portion 30 feet wide is now in progress under the Sang contract. The amount of rock placed under the Sang contract to June 30, 1908, was 26,915 tons, at a price of 99 cents per ton. This has covered a distance of 1,303 feet, of which 621 feet was on the 20-foot width and 682 on the 30-foot portion. Some details of the work under the several contracts are given herewith in tabular form

Ashland breakwater—Rock revetment to June 30, 1908.

Contracts.	Donald & Co.	Geo. A. Wieland.	A. Sang.	Total.
Portion 20 feet wide.				
Period of contract work	June 6, 1903, to June 29, 1904.	Aug. 25, 1905, to Aug. 17, 1907.	Aug. 20, 1907, to Oct. 26, 1907.	
Amount of rock, tons	31,999	53,159	12,000	97,158
Price per ton, cents	85	79	99	
Contract cost	$27,199.15	$41,995.61	$11,880	$81,074.76
Distance revetted, linear feet	1,766	2,213	621	4,600
Between stations	1021–2787	2787–5000	5000–5621	1021–5621
Percentage of entire length of 7,363 feet	24	30	8	62
Amount of rock per linear foot, tons	18.12	24.02	19.32	21.12
Contract cost per linear foot	$15.40	$18.98	$19.13	$17.62
Portion 30 feet wide.				
Period (contract not complete)			Oct. 26, 1907, to June 30, 1908.	
Amount of rock, tons			14,915	
Cost, at 99 cents			$14,765.85	
Distance, stations 5621–6303			682	
Amount per linear foot, tons			21.87	
Contract cost per linear foot			$21.65	

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The dredgings by the United States in 1907, amounting to about a hundred thousand yards, were dumped alongside the breakwater in advance of the revetted portion to build up an earth embankment on which to place the rock and thus reduce the cost of the latter. In depositing this material the scow was placed close to the breakwater, wherever the depth of water would permit with the draft of the scow, and the remainder as near the breakwater as possible. The material was a mixture of clay and sand. This, together with dumpings of former years, resulted in reducing the depth of water next to the breakwater to about 8 to 9 feet (at low water) for the greater part of the distance.

The total distance of revetted work is now 5,282 feet, which is 72 per cent of the entire length. The amount of rock required for completion is difficult to estimate on account of the uncertain character of the bottom, and it is probable that the present contract will fall short of reaching the end by several thousand tons. By "completion" is here meant the building of the revetment to grade for the remaining length of the breakwater, but not the filling out of settlements mentioned in next paragraphs.

Considerable settlement has occurred of the rock placed under the first contract, in 1903–4, particularly on the north side, where it is exposed to blows of waves in northeast storms. This was to be expected from the character of the foundation, which consists of dredgings, but the extent of it could not very well be predicted. The amount of settlement along the upper portion of the north slope has been about 2 feet, and very little at the south slope. The amount of settlement in volume is about 2 yards per linear foot, or perhaps one-eighth of the amount of rock placed, for a distance of about 2,000 feet.

As soon as the entire length of the breakwater is revetted on the present plan the portions where settlement has occurred should be refilled to grade, or somewhat higher. The settlement after that time is likely to be much less, on account of approaching a limit by long standing.

Other portions of the revetment are likely to settle and require filling out in a similar manner at a later time.

Following is an estimate of the amount which could be profitably expended for maintenance in the fiscal year ending June 30, 1910:

Completing revetment of old breakwater on present plan	$5,000
Restoring to grade settlements in rock revetment	22,000
Removing shoals from channels	5,000
	32,000

The present Government channel is too narrow for the convenient use of vessels, and should be dredged at once to a width of 200 feet. This would require the removal of 127,000 yards, at an estimated cost of $25,000.

It is proposed to deposit the material dredged on the site of the extension of the breakwater, a distance of 637 feet (to make a total of 8,000 feet, as provided in the approved project), where the present depth is about 26 feet, so as to build up a wide earth embankment to within about 9 feet of the water surface, with flat slopes, for a foundation on which to build the superstructure of the breakwater. This foundation would be deposited from dump scows

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without additional cost to the price of dredging, and would effect a saving of material in the construction of the breakwater.

Money statement.

July 1, 1907, balance unexpended		$115,345.37
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$8,500.00	
For maintenance of improvement	42,432.53	
		50,932.53
July 1, 1908, balance unexpended		64,412.84
July 1, 1908, outstanding liabilities		1,787.65
July 1, 1908, balance available		62,625.19
July 1, 1908, amount covered by uncompleted contracts		52,100.00
Amount (estimated) required for completion of existing project		311,500.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$15,000.00	
For maintenance of improvement	32,000.00	
		47,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

August 5, 1886	$22,500	March 3, 1899	$35,000
August 11, 1888	60,000	June 13, 1902	40,000
September 19, 1890	60,000	March 3, 1905	60,000
July 13, 1892	45,000	March 2, 1907	90,000
August 18, 1894	25,000		
June 3, 1896	27,000	Total	464,500

CONTRACTS IN FORCE.

Contract entered into June 27, 1907, with Alexander Sang, of Duluth, for furnishing and placing about 70,000 tons of riprap alongside and on top the breakwater, at 99 cents per ton of 2,000 pounds. (Contract not yet forwarded to Chief of Engineers for approval.) Work to commence within one month after approval and to be completed by December 1, 1908.

Contract entered into May 18, 1907, with the Zenith Dredge Company, of Duluth, for about 92,000 cubic yards dredging at 14¾ cents; approved May 29, 1907. Work to commence after the Ontonagon dredging and be completed (including the Port Wing dredging) by October 10, 1907.

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Chequamegon Bay, Wisconsin (Ashland, Washburn, and Bayfield), for the calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Estimated net registered tonnage.
Steam	1,115	1,119	2,234	3,994,[illegible]

Increase in number of vessels, 132; increase in net registered tonnage, 25,67[illegible]; average tonnage, 1,788.

Passengers arriving, 764; departing, 612; total, 1,376.

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Receipts and shipments of freight.

[Tons of 2,000 pounds.]

Receipts.	Tons.	Shipments.	Tons.
Coal hard	48,321	Iron ore	3,850,193
Coal, soft	696,635	Lumber (65,119 M feet)	97,679
Lumber (1,008 M feet)	1,512	Grain (1,857,608 bushels)	48,000
Unclassified	54,628	Unclassified	5,000
Miscellaneous	8,334	Pig iron	13,394
		Miscellaneous	32,543
Total	809,430	Total	4,046,809

Total receipts and shipments, 4,856,239 tons; decrease, 53,792 tons, equal to about 1 per cent.

Total valuation, $23,856,242; increase over 1906, $3,062,764, equal to 15 per cent.

In addition there were 52,760,000 feet of logs towed in, valued at $791,400.

Arrivals and clearances of vessels at Bayfield, Wis., for the calendar year 1907.

[These figures are included in those for Chequamegon Bay.]

Vessels arriving, 52; departing, 54; total, 106. Estimated tonnage, 48,237. Passengers arriving, 390; departing, 291; total, 681.

Freight received and shipped.

[Tons of 2,000 pounds.]

Received.	Tons.	Shipped.	Tons.
Unclassified	1,703	Lumber (34,331 M feet)	51,497
		Lath (4,801 M)	1,200
		Merchandise	1,866
Total	1,703	Total	54,563

Total receipts and shipments, 56,266 tons.

Total valuation, $1,321,644.

In addition, there were 12,000,000 feet of logs towed in, valued at $180,000.

NOTE.—The local ferry business between Ashland, Washburn, and Bayfield amounted to 3,420 trips, carrying 52,145 passengers. There is also quite an extensive excursion business between the above towns and the Apostle Islands; also of tugs, of which no record is kept.

J J 6.

IMPROVEMENT OF HARBOR AT ONTONAGON, MICHIGAN.

For further details see previous Annual Reports of the Chief of Engineers, United States Army, particularly the one for 1896.

A survey of the harbor and of the river up to a distance of about five-eighths of a mile above the bridge was made in June, 1903. A reduced copy of the resulting map accompanies the report for 1903.

The project for the improvement of this harbor was completed in 1889. A short account of the work done for maintenance since that time, together with the results obtained, is given in the Annual Report of the Chief of Engineers for 1907, page 1850.

On May 6, 1907, bids were opened and a contract entered into on May 18, 1907, with the Zenith Dredge Company for about $4,000

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worth of dredging, at 17½ cents per yard, a very cheap figure. On May 11 a series of soundings was taken between the piers, and a few days later it was found that high water in the river, caused by rains had shoaled the channel so that soundings were taken a second time on May 16. These soundings showed a shoaling during the interval of five days of 3.5 feet and less.

Further shoaling developed in June, so that the then available funds would have been insufficient to make even a single dredge cut from the lake to the wharves. To relieve the situation, an allotment of $10,000 from the emergency appropriation act of March 2, 1907, was granted on June 22, and a supplemental contract was then entered into with the Zenith Dredge Company for increasing the dredging to a total amount of 62,000 cubic yards, more or less. Dredging under contract was begun June 15, 1907, and completed August 11, 1907. A total amount of 70,335 cubic yards were removed under the contract, leaving the harbor in fairly good condition. An examination made April 26–28, 1908, showed that since the survey of August, 1907, shoaling had occurred in the lake approach, amounting to 2 or 3 feet on the bottom of the dredged channel; that between the piers there was 13 feet depth for a least width of 75 feet; that from the inner ends of the piers there was a narrow 13-foot channel on the east side to the north end of commercial dock, while the channel dredged last year on west side of inner harbor up to and in front of the lumber wharf was badly shoaled, no more than 8 feet of water being available. Another examination made in June showed some further shoaling, amounting to as much as 2 feet in one place. The least depths are now as follows: In the lake approach, 13.8 feet; between the piers, 11.8 feet; channel to commercial dock, 11.1 feet; channel to lumber dock, about 8 feet.

The Ontonagon River brings down in flood large quantities of material, and when this reaches the harbor it is quickly deposited, the flow from the river being insufficient to keep the cross section between the piers clear. An extension of the piers to deeper water would improve the situation somewhat, but would not eradicate the evil. It is believed that the best results can be obtained by making a sufficient appropriation at one time to thoroughly dredge the area between the piers and up to the two docks, and then provide a sum for maintenance sufficient to dredge out the results of at least two bad floods and keep this on hand until a bad season should occur.

It is also recommended that Congress be asked to insert in the next river and harbor bill an item making certain changes in the present project, the depths authorized in which being no longer adequate. The present project was adopted in 1867. It provides for the construction of parallel piers, 250 feet apart, on either side of the mouth of the Ontonagon River, extending to the 18-foot curve of depth in Lake Superior, and for securing and maintaining a navigable depth of 12 feet between them.

The depth of 12 feet may have been sufficient at that time, but at present the chief business of Ontonagon is the manufacture and shipment of lumber, and the lumber carriers usually load now to from 13 to 14 feet, and hence can not operate with full loads on a 12-foot draft. References to the necessity for dredging deeper than the 12-foot depth which the project calls for, is given in the Annual Report of the Chief of Engineers for 1907, pages 595, 596, and Appendix J J 6 to same report, page 1850; also in House Document No. 444, Sixtieth Congress, first session, paragraph 45.

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I would therefore recommend that the project also provide for a greater depth in the lake approach to the harbor entrance, which is needed on account of the pitching of a vessel in a sea. All dredging should be done to enough greater depth than those above given to provide a reasonable margin for shoaling.

While the project mentions only the dredging between the piers, it has been necessary for many years to dredge through a bar in the lake outside the piers. The district officers also have understood the project as providing for dredging the river up as far as the county bridge, about 900 feet from the inner end of the entrance piers, this space being sometimes called the "inner harbor." Major Sears, in his annual reports for 1898, 1899, and 1900, states: "The project is for maintaining a navigable depth of 12 feet between the piers and up to the bridge just inside the entrance." The Government has partially dredged the inner harbor several times, and this has been supplemented by municipal and private dredging when the Government funds were not sufficient. In recent years the dredging of the entire inner harbor has not been attempted, on account of insufficient appropriations, and instead of that narrow channels have been constructed on each side of the harbor.

The inner harbor is a kind of catch basin for material coming down the river, and is continually shoaling up. No attempt has been made since the year 1896 to dredge out the inner harbor entire, but only to provide access to the wharves by narrow channels, and I think this is as much as should be undertaken by the Government hereafter.

I would not dredge along the face of a wharf, for the reason that such space is more in the nature of a private slip than a public channel. Vessels, for instance, are moored to a wharf for an indefinite period while loading lumber, and during such time this part of the channel, of course, is not available for general navigation. For this reason I am of the opinion that dredging immediately in front of wharves in a harbor like that at Ontonagon should be attended to by the owner of the wharf or by the municipality.

There would be no object in constructing a central channel in the inner harbor up to the county bridge unless the entire inner harbor were dredged out, and as the cost of dredging the entire inner harbor would hardly be warranted by the benefits to be derived I do not recommend that it be done, at least for the present.

I would therefore recommend that, in addition to dredging between the entrance piers and in the lake, a channel be dredged from the inner end of the entrance piers up to the nearest end of the commercial dock, on the east side of the inner harbor, a distance of 600 feet, and another channel from the inner end of the piers up to the nearest end of the lumber dock, on the west side of the harbor, a distance of 300 feet, these channels to be no wider than necessary for vessels to pass through them easily. The two wharves mentioned are the ones where practically all the business of this harbor is transacted.

In addition to the needs for dredging, as mentioned above, the west pier is in bad shape at its outer end and will undoubtedly call for some repairs in the next two years.

The needs of this harbor in the next river and harbor appropriation will be for dredging the entrance and harbor and repairing the piers.

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Money statement.

July 1, 1907, balance unexpended	$14,602.48
June 30, 1908, amount expended during fiscal year for maintenance of improvement	13,770.72
July 1, 1908, balance unexpended	831.76
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	20,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

March 2, 1867	$97,600	September 19, 1890	$10,000
July 7, 1870	10,000	July 13, 1892	20,000
June 23, 1874	23,000	August 7, 1894	7,000
March 3, 1875	25,000	June 3, 1896	10,000
August 14, 1876	15,000	Received on account of damage to piers	28
June 18, 1878	15,000	June 13, 1902	5,000
March 3, 1879	17,000	March 3, 1905	3,000
June 14, 1880	15,000	March 3, 1905 (allotments)	10,000
March 3, 1881	20,000	March 2, 1907	5,000
August 2, 1882	20,000	March 2, 1907 (allotments)	10,000
July 5, 1884	15,000		
August 5, 1886	13,000		
August 11, 1888	12,500	Total	378,128

CONTRACTS IN FORCE.

Contract, dated May 18, 1907, with Zenith Dredge Company, of Duluth, Minn., for dredging to remove shoals at entrance and between the piers. About 21,000 yards to be removed, at 17½ cents. Approved May 29, 1907. Work to begin June 10, 1907, and to be completed (including Ashland and Port Wing dredging) October 10, 1907.

Supplemental contract dated June 27, 1907, increasing the amount to be dredged to 62,000 yards, more or less. Approved by the Chief of Engineers July 20, 1907, and the Acting Secretary of War July 22, 1907. No change in price or date of completion of work.

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Ontonagon, Mich., for the calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Estimated net registered tonnage.
Steam	144	144	288	91,686
Tow	4	4	8	3,209
Total	148	148	296	94,895

Decrease in number of vessels under 1906, 94. Decrease in registered tonnage, 30,362.

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Receipts and shipments of freight.

[Tons of 2,000 pounds.]

Receipts.	Tons.	Shipments.	Tons.
Coal	1,300	Lumber (3,080,432 feet)	4,620
General merchandise	1,091	Farm produce	110
Fish	211		
Total	2,602	Total	4,730

Total receipts and shipments, 7,332 tons. Decrease under 1906, 14,079 tons, equal to 65.8 per cent.

Total valuation, $345,493; decrease, $451,554, equal to 56.7 per cent.

In addition to the above there were 2,145,409 feet of logs received, valued at $32,000; decrease in logs, 6,504,591, equal to 75.2 per cent.

Decrease in value of logs, $97,750, equal to 75.3 per cent.

A shoal at the entrance to this harbor, the entire removal of which was not completed until August 1, 1907, prevented the shipment of lumber until that date.

J J 7.

IMPROVEMENT AND OPERATING AND CARE OF WATERWAY FROM KEWEENAW BAY TO LAKE SUPERIOR, MICHIGAN.

For the history of this waterway and its purchase by the United States, see Report of the Chief of Engineers for 1892, Appendix II, page 2158. For the work of improvement by the United States, see subsequent annual reports. A complete detailed description of this waterway is also given in Bulletin No. 18, published by the Survey of Northern and Northwestern Lakes April, 1908, pages 70 to 74. See, also, the new chart, in colors, issued March 15, 1905, by the Survey of Northern and Northwestern Lakes.

The approved project for improvement is not fully completed, although nearly so, and the river and harbor act of March 3, 1905, appropriated $45,000 for "continuing improvement."

The only work of improvement done during the past year was some dredging carried on in May and June, 1908, to ease the bend along the west bank at the head of Portage River under contract with the Zenith Dredge Company, of Duluth, at $25 per hour. The total amount of excavation for improvement under this contract was 8,139 cubic yards, costing $2,689.84.

In December, 1907, by decision of the Auditor the claim of Porter Brothers, of Duluth, was allowed and they were paid $9,229.71 for dredged sand and gravel (stamp sand for cribs) furnished during the year 1901 in building breakwater piers at Lake Superior entrance to Portage Lake ship canals, Michigan, under contract dated September 22, 1897.

The large commerce carried through the Portage Lake canals is evidence of the importance of this waterway and of the benefits derived from its improvement.

The needs of further improvements to this waterway have begun to receive consideration.

In my predecessor's special report to you, under date of December 29, 1903, was set forth the need of a harbor of refuge at the lower end

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of this waterway, just inside the mouth of Portage River, similar to the harbor of refuge near the upper end, known as Lily Pond.

Another possible improvement that would be of value is to straighten the channel of Portage River by cutting off Princess Point, with its sharp bend—a bend that is causing some inconvenience to the larger class of vessels, especially passenger boats that now use this waterway. The condition at this point has been very much improved by the work done during the fiscal year ending June 30, 1905, but it will always present some difficulties to the navigator unless straightened.

The remaining balance of the appropriation ($1,853.34) was intended for the renewal of some of the old revetments, which were in poor shape when the canal was purchased by the United States. Every cut was revetted with a timber-and-pile revetment to prevent wash of the banks. In many cases the cuts were through clay and in swamps, and it is not believed that much wash will occur, especially as the portion of the revetment below water will not decay. For this reason it has been decided not to renew useless woodwork, which will again decay, and the revetments in some places will be allowed to remain as they are until the necessity for their renewal shall be demonstrated.

OPERATING AND CARE.

Location.—The Portage Lake ship canals constitute the waterway across Keweenaw Point, in the State of Michigan, from Keweenaw Bay to Lake Superior, there being about 25 miles of water route, consisting of 5½ miles of Portage River with its four cuts, 17 miles of Portage Lake, and 2½ miles in the upper canal from the head of Portage Lake to Lake Superior.

Under authority of the river and harbor act of September 19, 1890, the Secretary of War allotted $14,000 for operating and care of canals and other works of navigation to be applied to Portage Lake and Lake Superior canals, Michigan, for the fiscal year ending June 30, 1908.

The approved project for the expenditure of this allotment is to maintain the depth and width obtained by the work of improvement; to keep a record of the vessels and their tonnage using the canals; to exercise the necessary care in enforcing regulations for the use of the canals; to make frequent surveys to determine changes and to check up work done in dredging; to guard against encroachments on the legally established harbor lines; and to perform other work incident to the operation and care of the canals. The amount allotted has been expended in carrying out the above programme of duties, except $1,100, which were reported and deducted from the estimate made for next year.

Under the contract previously mentioned with the Zenith Dredge Company, of Duluth, Minn., the following dredging for maintenance was done, namely, 4,747 cubic yards from shoals at the entry, and 2,203 cubic yards from shoals in the channel at the head of Portage River, the total cost being $3,294.58. This work has removed the worst shoal places where vessels had trouble this spring.

A small amount of private dredging was done in front of the Quincy Smelting Works dock, where a depth of 20 feet L. W. D. was obtained. The material was dumped well out of the way of the channels, under the supervision of junior engineer, George H. Banks.

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The work of repairs to breakwater "Ls" commenced during the month of June, 1907, was continued during this year and the berm of the west L built up by placing about 50 cords of large blocks of sandstone at the base of the cribs on the lake side. Over these large blocks 30 cords of rubble sandstone were placed to fill in the voids between the rock. In the pockets from which the rock filling had escaped 17½ cords of blocks and 34 cords of sandstone rubble were placed. At the east breakwater pier 62 cords of large blocks were put on the berm at the base of the cribs on the lake side, 17 cords of rubble in the empty pockets, and the work of placing rubble over the large blocks is now going on. In order to fill the various pockets the decking had to be taken up, and when pockets were filled were replaced and fastened down with ⅝ by 12 inch lag screws and ½ by 12 inch boat spikes.

Repairs were also made to breakwater pier at Portage entry near the shore end, where the water is about 4 feet deep. At this point 19 sloping face planks attached to a longitudinal timber were loosened up at the bottom during storms last fall, and as this lower timber was fastened to the old original pier, which affords poor holding for drifts, the repairs were made by placing 6¼ cords of large blocks of sandstone over the lower ends of the planks and at the base of the cribs.

The above work was done by the Government, using the tug crew, watchman, and hired labor to handle the rock, which was towed by the U. S. tug *Circle* from the Jacobsville quarry dock on the United States derrick scow. The cost of stone and labor to do the above amount of work was about $1,176.

When examinations were made in June, 1908, it was found that the rock placed on the berm and in the pockets had stood the fall and winter storms in fairly good shape; but a deficiency of rock was found on the berm at the base of the cribs for a distance of 450 feet from the hip of the east L. In some places along this distance the rock was below the bottom of the cribs, and rock filling had settled in several of the pockets from 2 to 7 feet. An agreement was entered into on June 13, 1908, with J. W. Wyckoff to furnish 150 cords of stone, more or less, and the work of placing this rock is now going on, using the method mentioned above.

During this fiscal year there were 15 breaks made in the revetments caused by vessels colliding with them on their way through—11 of these breaks were at the upper canal above Lily Pond, 2 in Cut 3, and 2 in Cut 4, Portage River. Three of the breaks above Lily Pond were repaired by contract through the usual way of asking for letter bids by "Public notice."

Henry F. Key, being the lowest bidder, was awarded the contract for repairing these three breaks, which were made by schooner *B. L. Pennington*, at a cost of $273.50, the bills being paid by the vessel owners, the Tonawanda Iron and Steel Company. Another break above Lily Pond, caused by the steamer *Tampa*, December 1, 1907, was repaired by hired labor and purchase of material at a cost to the Government of $93.26. The four breaks in Portage River are not of a serious nature, and the channels will not suffer by letting them go unrepaired, as is also the case with the remaining seven breaks above Lily Pond, with the exception of possibly two breaks made by schooner *Arenac*, May 13, 1908.

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The damage to Cut 3 revetment in Portage River made by steamer *Schuylkill*, May 27, 1907, was repaired during July and August, 1907, by John P. Richards, after asking for bids in the usual manner; the cost of these repairs were paid by the vessel owners, the Erie and Western Transportation Company, and amounted to $425.

Since November, 1905, only the most serious breaks have been repaired, and when such breaks have been plainly due to manifest carelessness the owners of the vessels have been called upon to pay for the repairs. This is done by agreement made by this office with the lowest bidder, with the understanding that payment will be made by check direct from the vessel owners to the contractor. The following table gives data covering the breaks which have occurred during the last four calendar years:

Damage to revetments by vessels at Portage Lake canals.

Designation.	1904.	1905.	1906.	1907.	Total in four years.
Number of breaks above Lily Pond	9	16	4	7	36
Number of breaks below or at Lily Pond	2	2	1	.....	5
Number of breaks in Portage River	3	2	.....	4	9
Total number of breaks	14	20	5	11	50
Number of breaks repaired by vessels	4	2	2	4	12
Cost of same	$410	$828	$399.50	$698.50	$2,336
Number of breaks repaired by United States	8	4	.....	1	13
Cost of same	$538	$700	.....	$93.00	$1,331
Number of breaks not repaired	2	14	3	6	25
Number of breaks repaired	12	6	2	5	25
Breaks by steamers	3	8	1	6	18
Breaks by schooners	5	10	3	1	19
Breaks by unknown vessels	2	2	.....	1	5

It will be seen that during the four years the revetments were broken in 50 different places. One-half of these were considered not serious enough to require repairs. The other half, 25 in number, were repaired at a cost of $3,667. Of these repairs, 12 were made by the vessel owners, on demand from this office, at a cost of $2,336, and 13 were made by the United States at a cost of $1,331.

This is a large number of breaks, averaging 12½ a year. However, when we take into account the number of vessels which have used the canals, and the narrowness of the channel, the fact that the revetment is built out in the deep-water channel and the frail character of the structure, it appears less remarkable that these should occur, and it may be that they happen no more often than should be expected from the theory of chances, and with the exercise of ordinary care on the part of the navigators.

Under the circumstances it seems that the Government should either make the revetment strong enough to stand the ordinary blows and rubbing of vessels without receiving injury, or else take the responsibility for damages which may occur from such ordinary use of the channel.

I would respectfully recommend that repairs of the worst breaks be kept up and continued during the life of the present superstructures of the revetments. When they reach the time of decay, and are ready to fall to pieces, then abandon instead of rebuilding them, and protect the shore by other means from the wash of vessels where necessary, as by a riprap or rubble revetment or rough pavement

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reaching a short distance above and below the water line, or by a row of sheet piling in shoal water not far out from the shore line. It is probable that such protection would be required only between Lily Pond and the lake, on the east side of the canal, and for only a portion of this distance.

A survey was made at the lower end of Portage River to locate soundings, marsh lines, shore lines, etc., for use in preparing plans and estimates in connection with the harbor of refuge recommended to be built at Portage entry. Other minor surveys were made from time to time as necessary.

A record of the water level has been continued three times a day at three points: At Houghton, at the watchman's house at the upper canal, and at the watchman's house on Portage River.

Two watchmen have been employed, one at the upper canal and one at Portage River. Each has kept a record of all passing vessels and rafts, reported damages to piers and revetments from collisions, violations of rules and regulations, and read a water gauge. The watchman at upper canal also kept a record of three wave dynamometers located on the breakwater piers.

In addition to the $1,100 left over from last year's allotment, $12,900 have been allotted for the year ending June 30, 1909, making $14,000.

Money statement.

IMPROVING WATERWAY.

July 1, 1907, balance unexpended	$14,889.82
June 30, 1908, amount expended during fiscal year for works of improvement	10,346.64
July 1, 1908, balance unexpended	4,543.18
July 1, 1908, outstanding liabilities	2,689.84
July 1, 1908, balance available	1,853.34

APPROPRIATIONS.

September 19, 1890:	
For the purchase of Portage canals	$350,000.00
For maintenance to June 30, 1892	10,000.00
For harbor lines, Portage Lake	5,128.70
Total	365,128.70

The above amounts were expended for the purposes for which appropriated.

FOR IMPROVING WATERWAY FROM KEWEENAW BAY TO LAKE SUPERIOR, MICHIGAN.

July 13, 1892	$50,000.00	March 3, 1901	$145,000.00
August 18, 1894	130,000.00	June 28, 1902	10,000.00
June 3, 1896	50,000.00	March 3, 1905	45,000.00
June 4, 1897	350,000.00	Miscellaneous	237.68
July 1, 1898	450,000.00		
June 6, 1900	110,000.00	Total	1,340,237.68

The following statement shows the manner in which the appropriations have been expended. The amount expended under the different classes of work includes the cost of examinations, soundings, superintendence, buoying, and contingencies.

Dredging	$528,426.83
Pier work, revetment, etc	793,061.67
Purchase of land	9,406.00
Tug and scow, etc	4,800.00
Total	1,335,694.50

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Allotments for operating and care of Portage Lake and Lake Superior canals, Michigan, from the permanent indefinite appropriation act of July 5, 1884, for operating and care of canals, etc.

July 1, 1892	$31,028	July 1, 1901	$8,500
July 1, 1893	11,647	July 1, 1902	9,000
July 1, 1894	8,000	July 1, 1903	15,500
July 1, 1895	11,500	July 1, 1904	15,000
July 1, 1896	8,300	July 1, 1905	8,500
July 1, 1897	8,300	July 1, 1906	9,250
July 1, 1898	8,300	July 1, 1907	12,900
July 1, 1899	8,300	July 1, 1908	14,000
July 1, 1900	8,300	Total	196,325

All the amounts were expended in maintaining the canals except $117.36 of the 1892 allotment, which amount reverted to the Treasury. The $14.000 allotted July 1, 1908, will be expended during the fiscal year ending June 30, 1909.

Summary of expenditures made from appropriations for operating and care of canals and other works of navigation (indefinite), act of July 5, 1884, applied to Portage Lake and Lake Superior canals, Michigan, during fiscal year 1908.

Date.	Office expense.	Field service.	Pier and revetment repairs.	Miscellaneous.	Total.
1907.					
July	$167.50	$549.00			$716.50
August	100.00	616.50		$397.75	1,114.25
September	30.00	98.72	$738.03	50.90	917.65
October	105.00	551.82			656.82
November	75.00	799.85			874.85
December	186.60	517.66	245.80		950.06
1908.					
January	117.00	332.01			449.01
February	100.00	300.86	41.26		442.12
March	123.32	330.00		25.58	457.90
April	167.34	444.00			611.34
May	129.24	668.94			798.18
June	128.35	4,034.12	703.54	15.31	4,881.32
Total	1,429.35	9,252.48	1,728.63	489.54	12,900.00

COMMERCIAL STATISTICS.

MARINE COMMERCE, PORTAGE LAKE SHIP CANALS, CALENDAR YEAR 1907—EXPLANATORY NOTES AND GENERAL INFORMATION.

The following records are for vessels passing through Portage Lake Ship Canals, Michigan; also for vessels entering the canals from either direction and discharging or loading at a port within the waterway.

Local traffic is not recorded—that is, vessels trading between points on Portage Lake and Torch Lake.

The ton as used in all these tables is 2,000 pounds.

Unit values for items of freight, and factors for converting various units of measurement into tons, are the same as used in the compilation of Duluth-Superior commerce for 1907 with but few exceptions.

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Loaded vessels 500 feet and over in length, drawing 19 feet 6 inches, have passed through these canals during the past season without difficulty, and there have been a greater number of the larger class of vessels using the waterway than ever before. The drawbridge between Houghton and Hancock has given very good service during the year and vessels have had little trouble passing through.

The average net registered tonnage of the 20 largest vessels passing through the waterway is 4,344 tons.

The commerce on Lake Superior is generally heaviest during July and August, yet it will be noted that there is more freight going through this waterway in October and November, or in the stormy season, than at any other time, which shows clearly the extent to which these canals are used for refuge.

The navigation season covers a period of two hundred and twenty-five days, extending from the opening on April 29 to the closing on December 9.

The earliest opening of these canals was April 4, 1902; the latest opening, May 9, 1893; the average, April 24. The earliest closing, November 26, 1896; latest closing, December 15, 1899; average, December 6.

SUMMARIZED STATEMENT OF COMMERCE.

Total vessel freight up and down during the year was 2,448,041 tons, valued at $101,774,806, 52.8 per cent of which, or 1,293,683 tons, valued at $51,217,580, was local commerce; that is, freight carried by vessels which entered from either direction and was shipped or received at a port within the waterway. Increase in through and local freight tonnage over 1897, a period of ten years, was 139.8 per cent.

There was a decrease of through and local freight of 184,314 tons as compared with the preceding year, or 7½ per cent. The principal commodities which show a decrease are: Copper, flour, iron ore, lumber, manufactured iron, miscellaneous merchandise, wheat, and other grains, the amount of decrease in these being 308,070 tons. On the other hand, there is an increase of 119,921 tons in the following items: Cement, hard coal, soft coal, pig iron, oil, and limestone.

Logs to the amount of 9,659,000 feet B. M., valued at $144,885, were towed through the canals, made up into 60 rafts—29 up and 31 down bound.

There were also 525 scows—264 up and 261 down bound—and 42 sets of booms towed through the waterway which are not included in this statement.

These statistics were compiled in the local office at Houghton, Mich., by Geo. H. Banks, junior engineer, overseer, from vessel reports made in compliance with the act of Congress approved February 21, 1891.

Table of prices and equivalents for reducing quantities to tons of 2,000 pounds.

Commodity.	Unit price.	Equivalent.
Cement.....barrels..	$1.65	5 barrels=1 ton.
Coal, hard.....tons..	6.25	
Coal, soft.....do....	3.12	
Copper.....do....	460.00	
Flaxseed.....bushels..	1.20	56 pounds=1 bushel.
Flour.....barrels..	5.00	10 barrels=1 ton.
Grain (except wheat and flax).....bushels..	.68	40 bushels=1 ton.
Miscellaneous merchandise.....tons..	210.00	
Iron, manufactured.....do....	80.00	
Iron ore.....do....	2.67	
Lath.....M..	3.75	4 M=1 ton.
Limestone.....tons..	1.30	
Lumber, green.....M feet..	20.00	1 M feet=1¼ tons.
Lumber, dry.....do....	20.00	1 M=1¼ tons.
Oil, kerosene, etc.....barrels..	6.50	5 barrels=1 ton.
Pig iron.....tons..	22.00	
Salt.....barrels..	.75	7 barrels=1 ton.
Sand.....cubic yards..	.65	1½ cubic yards=1 ton.
Stone, building.....tons..	5.75	
Shingles.....M..	3.00	10 M=1 ton.
Ties, railroad.....number..	.65	18=1 ton.
Wheat.....bushels..	.98	60=1 bushel.

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THROUGH MARINE COMMERCE, PORTAGE LAKE SHIP CANALS, MICHIGAN.

Quantities and values, eastbound and westbound.

Commodity.	Unit.	Quantity.	Valuation.	Tons.
Cement	Barrels	38,925	$64,226	7,785
Coal, hard	Tons	74,616	466,350	74,616
Coal, soft	do	185,788	579,659	185,788
Copper	do	2,407	1,107,220	2,407
Flaxseed	Bushels	884,000	1,060,800	24,733
Flour	Barrels	1,170,520	5,852,600	117,052
Grains (except wheat and flax)	Bushels	206,500	181,220	6,602
Miscellaneous merchandise	Tons	140,107	29,422,470	140,107
Iron, manufactured	do	74,494	5,959,520	74,494
Iron ore	do	127,095	339,344	127,095
Lath	M	5,887	22,076	1,472
Limestone	Tons	33,511	43,564	33,511
Lumber	M feet	151,149	3,022,980	251,724
Oil	Barrels	33,820	219,830	6,764
Pig iron	Tons	10,427	229,394	10,427
Salt	Barrels	205,879	154,409	20,611
Stone, building	Tons	3,128	17,986	3,128
Shingles	M	52,120	156,360	5,212
Ties, railroad	Number	34,200	22,230	1,900
Wheat	Bushels	1,666,355	1,634,988	80,053
Passengers	Number	10,103		
Total			50,557,226	1,154,288

LOCAL MARINE COMMERCE, PORTAGE LAKE SHIP CANALS, MICHIGAN.

Quantities and values received and shipped.

[Aggregate of all the harbors.]

Commodity.	Unit.	Quantity.	Valuation.	Tons.
Cement	Barrels	23,830	$39,320	4,766
Coal, hard	Tons	86,288	539,300	86,288
Coal, soft	do	1,001,533	3,124,783	1,001,533
Copper	do	82,872	38,121,120	82,872
Flour	Barrels	45	225	5
Grain (except wheat and flax)	Bushels	8,130	5,528	203
Iron, manufactured	Tons	8,146	651,680	8,146
Lath	M	155	582	39
Limestone	Tons	8,619	11,205	8,619
Lumber	M feet	12,554	251,080	21,093
Miscellaneous merchandise	Tons	38,798	8,147,580	38,798
Oil	Barrels	12,145	78,942	2,429
Salt	do	4,568	3,426	652
Sand	Cubic yards	11,612	7,548	3,709
Stone, building	Tons	12,458	71,633	12,458
Ties, railroad	Number	191,596	124,537	10,643
Unclassified	Tons	5,554	39,091	5,554
Passengers	Number	34,713		
Total			51,217,580	1,293,655

In addition to the above there were 9,659,000 feet B. M. of logs, valued at $144,855.

NOTE.—By local commerce is meant the vessel commerce of the towns on Portage Lake and Torch Lake. It does not include, however, the vessel business transacted between these towns.

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THROUGH AND LOCAL COMMERCE, 1907, PORTAGE LAKE SHIP CANALS, MICHIGAN.

Quantities and values, eastbound and westbound, received and shipped.

Commodity.	Unit.	Quantity.	Valuation.	Tons.
Cement	Barrels	62,755	$103,546	12,551
Coal, hard	Tons	160,904	1,005,650	160,904
Coal, soft	do	1,187,321	3,704,442	1,187,321
Copper	do	85,279	39,228,340	85,279
Flaxseed	Bushels	884,000	1,0[illegible]0,800	24,752
Flour	Barrels	1,170,565	5,852,825	117,056
Grain (except wheat and flax)	Bushels	274,630	18[illegible],748	6,866
Miscellaneous merchandise	Tons	178,905	37,570,050	178,905
Iron, manufactured	do	82,640	6,611,200	82,640
Iron ore	do	127,095	339,344	127,095
Lath	M	6,042	22,658	1,511
Limestone	Tons	42,130	54,769	42,130
Lumber	M feet	163,703	3,274,060	273,692
Oil	Barrels	45,905	298,772	9,493
Pig iron	Tons	10,427	229,394	10,427
Salt	Barrels	210,447	157,835	30,064
Sand	Cubic yards	11,612	7,548	8,709
Stone, building	Tons	15,586	89,619	15,586
Shingles	M	52,120	156,360	5,212
Ties, railroad	Number	225,796	146,767	12,543
Wheat	Bushels	1,6[illegible]8,355	1,634,988	50,051
Unclassified	Tons	5,554	39,091	5,554
Passengers		44,816		
Total			101,774,806	2,448,041

In addition to the above, 9,659,000 feet B. M of logs, valued at $144,885, were towed through the canals.

THROUGH AND LOCAL MARINE COMMERCE, 1907, PORTAGE LAKE SHIP CANALS, MICHIGAN.

Number of vessels and net registered tonnage.

	Steam vessels except tugs.		Tow barges.		Tugs.		Total vessels.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Westbound	1,343	1,471,569	285	236,759	465	17,186	2,093	1,725,514
Eastbound	929	615,014	152	119,360	473	17,799	1,554	752,173
Total	2,272	2,086,583	437	356,119	938	34,985	3,647	2,477,687

These vessels include all which passed entirely through, whether stopping at local ports or not, and all vessels which entered part way into the waterway and departed again the same way.

Through and local commerce, westbound and eastbound.

[Comparison with preceding year.]

Designation.	1906.	1907.
Number of vessels	3,567	3,647
Net registered tonnage	2,454,414	2,477,687
Freight in tons of 2,000 pounds	[a] 2,632,355	[b] 2,448,041
Valuation of freight	[a] 102,846,779	[b] 101,774,806
Passengers	72,400	44,816

[a] This does not include 5,603 000 feet of logs, valued at $84,045.
[b] This does not include 9,659,000 feet of logs, valued at $144,884.

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Openings and closings of navigation in Portage Lake ship canals, Michigan, while in charge of the United States, 1891 to 1906, inclusive.

Date of opening.	Steamer.	Date of closing.	Steamer.
April 26, 1892	Nipigon.	November 30, 1891	A. L. Hopkins.
May 9, 1893	Jos. L. Hurd.	November 30, 1892	S. F. Hodge.
April 22, 1894	Japan.	November 29, 1893	J. H. Shrigley.
April 25, 1895	Annie R. Hennes.	November 30, 1894	Jay Gould.
April 24, 1896	City of Duluth.	December 2, 1895	Matoa.
April 23, 1897	Peerless.	November 26, 1896	Cumberland.
April 17, 1898	Iroquois.	December 2, 1897	Japan.
May 1, 1899	R. G. Stewart.	December 4, 1898	Martin Swain (tug).
April 19, 1900	Bon Voyage.	December 15, 1899	Cora A. Sheldon, with whaleback No. 137.
April 23, 1901	Mabel Bradshaw.		
April 4, 1902	Bon Ami.	December 8, 1900	Cuba.
April 15, 1903	W. H. Gratwick.	December 8, 1901	Clyde, with Amboy.
April 30, 1904	Tug Valerie.	December 13, 1902	Grover.
April 12, 1905	Schuylkill.	December 9, 1903	Hutchinson.
April 18, 1906	Philip Minch.	December 5, 1904	North Star.
May 7, 1907	———	December 11, 1905	Eber Ward.
April 22, 1908	Nellie Cotton.	December 10, 1906	———
		December 9, 1907	James Reid.

J J 8.

IMPROVEMENT OF HARBOR AT MARQUETTE, MICHIGAN.

For a history of this harbor, see Annual Reports of the Chief of Engineers for previous years.

For detailed description of this concrete work, with drawings, photographic views, cost, etc., see the Annual Reports, for 1896, pages 2365 to 2385; 1897, pages 2615 to 2638, and 1898, pages 2252 to 2282. The Annual Report for 1904, pages 2775 and 2776, gives a description and cross section of the latest portion of the work, which includes certain modifications in the method of construction found advisable by experience during the earlier progress.

The concrete superstructure is now built to a total length of 2,920 feet, which is 97 per cent of the entire length, and has been connected with the shore at the northerly end by building a protection wall 100 feet long. The concrete work stops 100 feet short of the end of the old breakwater. To complete the existing project it would only be necessary to build a pierhead and connect it with the finished work. This would cost $20,000, and the funds are now available should Congress decide not to extend the breakwater.

Attention is invited to report from this office of September 30, 1903, printed in House Executive Document No. 161, Fifty-eighth Congress, second session, and also printed in the Annual Report of the Chief of Engineers for 1904, Appendix II, page 2786, recommending a further extension of this breakwater, in which the division engineer, the Board of Engineers for Rivers and Harbors, and the Chief of Engineers, United States Army, concurred. If provision be made by Congress for this extension no pierhead will be required at the present end of the breakwater, and the present form of concrete superstructure could be continued over the gap of 100 feet previously mentioned at a cost of $6,000 from the funds held in reserve for improvement.

No work was done during the year.

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Money statement.

July 1, 1907, balance unexpended	$29,714.23
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1,408.05
July 1, 1908, balance unexpended	28,306.18
July 1, 1908, balance available	28,306.18
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	10,000.00

APPROPRIATIONS.

March 2, 1867 (allotment)	$85,000.00	August 11, 1888	$25,000.00
April 10, 1869 (allotment)	26,730.00	September 19, 1890	40,000.00
July 11, 1870	25,000.00	July 13, 1892	80,000.00
March 3, 1871	60,000.00	August 18, 1894	30,000.00
June 10, 1872	50,000.00	June 3, 1896	29,000.00
March 3, 1873	15,000.00	March 3, 1899	25,000.00
June 23, 1874	15,000.00	June 13, 1902	26,000.00
March 3, 1875	15,000.00	March 3, 1903, sundry civil act	80,000.00
June 18, 1878	2,000.00	March 3, 1905	3,000.00
August 14, 1878	2,000.00	March 2, 1907	30,000.00
March 3, 1879	1,500.00	Miscellaneous receipts	358.69
June 14, 1880	1,000.00		
August 2, 1882	16,000.00		
July 5, 1884	5,000.00	Total	697,588.69
August 5, 1886	10,000.00		

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Marquette, Mich., including Presque Isle, Mich., for the calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Estimated net registered tonnage.	Average.
Steam	532	524	1,056	2,150,016	2,036
Tow	73	69	142	167,560	1,180
Total	605	593	1,198	2,317,576	1,935
Decrease	348	338	686	1,360,416	17

Decrease in number of vessels equal to 36.4 per cent. Decrease in tonnage, 37 per cent.

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Receipts and shipments of freight from Marquette, Mich., including Presque Isle, for calendar year 1907.

[Tons of 2,000 pounds.]

Receipts.	Tons.	Shipments.	Tons.
Coal, hard and soft	386,277	Iron ore	3,375,612
Coke	73	Pig iron	7,353
Brick (125,000)	3,125	Lumber (4,461 M feet)	6,691
Salt (3,000 barrels)	450	Stone (7,000 cords)	42,000
Oil (400 barrels)	58		
Manufactured iron	842		
General merchandise	16,500		
Total	407,325	Total	3,431,656

Total receipts and shipments, 3,838,981 tons. Increase over 1906, 783,967 tons, equal to 25.6 per cent.

Total valuation, $14,228,748; increase, $2,432,763, equal to 20.6 per cent.

These figures do not include the numerous vessels which ran into the harbor for shelter, or tugs engaged in the fish trade.

Arrivals and clearances of vessels at Presque Isle, Mich., for the calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Estimated net registered tonnage.
Steam	305	305	610	1,429,840
Tow	26	26	52	55,380
Total	331	331	662	1,485,220

Decrease in number of vessels, 92; decrease in registered tonnage, 205,416.

Freight received and shipped.

[Tons of 2,000 pounds.]

Receipts.	Tons.	Shipments.	Tons.
Manufactured iron	842	Iron ore	1,893,339
		Pig iron	7,353
		Lumber (2,059 M feet)	3,109
Total	842	Total	1,903,801

Total freight, 1,904,243 tons; decrease, 31,376 tons; equal to 1.6 per cent.

Total valuation, $5,319,697; decrease, $87,901; equal to 1.6 per cent.

These figures do not include tugs or scows, or vessels which ran into the harbor for shelter.

J J 9.

HARBOR OF REFUGE, MARQUETTE BAY, MICHIGAN.

This harbor is also known as Presque Isle Harbor.

For the description of the locality and the interests to be benefited by the improvement, see Annual Report of the Chief of Engineers, United States Army, 1896, pages 2385, 2386.

For the work of improvement, see the Annual Reports of the Chief of Engineers, United States Army, for years 1897, 1901, and 1903. See also the current summary.

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The approved projects were for building 1,000 feet of breakwater running out from Presque Isle Point (completed in 1900), and afterwards for closing a gap between said breakwater and the shore by cribwork 216 feet long (completed in 1902).

The work, which affords great protection to the commercial business done in this bay, was, when last visited, in fairly good condition, though the breakwater is now liable to need repairing at any time after a severe storm.

The available balance, together with the appropriation recommended, it is proposed to expend for maintenance.

Nothing done during the year.

Money statement.

July 1, 1907, balance unexpended	$902.66
July 1, 1908, balance unexpended	902.66
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	2,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 3, 1896	$20,000
March 3, 1899	30,000
June 13, 1902	7,500
March 3, 1905	1,000
Total	58,500

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Presque Isle Harbor, Michigan, for the calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Estimated net registered tonnage.
Steam	305	305	610	1,429,840
Tow	26	26	52	55,380
Total	331	331	662	1,485,220

Decrease in number of vessels, 92; decrease in registered tonnage, 205,416.

Freight received and shipped.

[Tons of 2,000 pounds.]

Receipts.	Tons.	Shipments.	Tons.
Manufactured iron	842	Iron ore	1,893,339
		Pig iron	7,353
		Lumber (2,059 M feet)	3,109
Total	842	Total	1,903,801

Total freight, 1,904,243 tons; decrease, 31,376; equal to 1.6 per cent.

Total valuation, $5,319,697; decrease, $87,901; equal to 1.6 per cent.

These figures do not include tugs or scows, or vessels which ran into harbor for shelter.

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JJ 10.

IMPROVEMENT OF HARBOR OF REFUGE AT GRAND MARAIS, MICHIGAN.

For a history of this harbor and the work of improvement by the Government see previous reports of the Chief of Engineers, including 1881, Appendix E E 4, page 2038, and 1871, page 131.

The pile dike which closes the natural entrance was built in 1895-1897 to prevent the wearing away of the narrow sand spit which extended to the east of the artificial entrance and arrest the movement of sand from the east, both of which agencies were gradually advancing sand bars into the harbor basin. It was also expected that with the dike in place the sand brought by wave action from the easterly shore would be distributed along the dike and form a permanent sand spit. These results have been partially realized, and a ridge of sand has been formed along the easterly portion of the dike and is slowly forming farther west. With the aid of an allotment of $5,000 from the appropriation for emergencies of rivers and harbors $14,000 were expended in repairing and strengthening this dike in 1904, and when the appropriation of March 3, 1905 ($50,000), was made it was decided that a greater portion of it should be expended in the same way. This was considered of more importance than extending the entrance piers, and led to a reenforcement of a large portion of the dike, which was done by placing an embankment of riprap behind it for a distance of 1,803 feet, and by building for another distance of 1,862 feet a second row of piles and filling between the old and new piles with cull hearts of saw logs and rock, thus making a total distance of 3,665 feet reenforced.

Of the remaining 2,105 feet of dike, 1,015 feet is in shallow water and therefore less exposed, and 1,090 feet has a sand beach against it, some of this beach being formed as a result of the construction of the dike.

It is hoped that no further work on the dike than this will be necessary, but it is possible that the riprap will settle into the sand bottom by the action of waves and require additional rock.

The present length of the west entrance pier is 1,912 feet and of the east pier 1,545 feet. These lengths include 100 feet of pile pier at the inner end of each. The west pier is 344 feet farther into the lake than the east pier.

On account of sand movement the 22-foot curve of depth has advanced lakeward between 400 and 500 feet since the project for improvement was adopted, and this fact will entail some additional expense for pier extension to deep water.

To extend the entrance piers out to 22 feet of water, in accordance with the approved project, would now require an addition of 360 feet to the west pier, at an estimated cost of $43,200, and an addition of 704 feet to the east pier, at a cost of $84,480, or about $44,512 more than the original estimate.

Some shoaling in the entrance channel has occurred since the last dredging (in 1904), soundings taken in June, 1908, showing least depths on center line, at low water, as follows: In lake approach, 17 feet; between the entrance piers, 14 feet. The least depth is found about halfway through the entrance. The water in the westerly

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half of channel runs about the same as on center line. In the easterly half of channel the water is about 1 foot shoaler.

Bids will be opened July 9 for removal of these shoals, work to commence promptly and be completed by September 30, 1908. Work will cost approximately $16,000.

The sand movement in front of the entrance is generally from the west toward the east, and it is important that the west pier be extended to deep water soon in order to shut off the encroachment of sand upon the channel from that direction. The extension of the east pier should be built after the completion of the west pier, and it is quite possible that its full extension will not be necessary.

No work was done during the year except a number of deck plank and a small amount of stone filling replaced at the low part of the east pier. Some poplar trees, alders, and a row of willows were planted between the sand fences for protection against the sand filling in the harbor.

Eighteen thousand dollars of the available balance, together with the sum recommended for works of improvement, it is proposed to expend in building the west pier of the entrance out to the 22-foot depth of water, a distance of 360 feet, at an estimated cost of $120 per linear foot. The remainder of the available balance, together with a sum of $40,000, will be needed for maintenance, which will be expended on repairs to piers and dike and dredging.

Money statement.

July 1, 1907, balance unexpended	$37,646.08
June 30, 1908, amount expended during fiscal year for maintenance of improvement	755.07
July 1, 1908, balance unexpended	36,890.96
Amount (estimated) required for completion of existing project	45,401.68
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$45,401.68
For maintenance of improvement	40,000.00
	85,401.68
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

June 14, 1880	$10,000.00	March 3, 1899	$25,000.00
March 3, 1881	20,000.00	June 6, 1900 (allotted)	384.32
August 2, 1882	40,000.00	June 13, 1902	70,000.00
July 5, 1884	35,000.00	Sale of United States property	125.00
August 5, 1886	26,250.00	June 13, 1902 (allotted)	5,000.00
August 11, 1888	50,000.00	March 3, 1905	50,000.00
September 19, 1890	50,000.00	March 2, 1907	30,000.00
July 13, 1892	30,000.00		
August 18, 1894	20,000.00		
June 3, 1896	24,000.00	Total	485,723.32

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COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Grand Marais, Mich., for calendar year 1907.

Vessels.	Arrived.	Cleared.	Total.	Estimated net registered tonnage.
Steam	839	836	1,675	776,7??
Tow	47	47	94	28,??
Total	886	883	1,769	804,9??

Decrease in number of vessels, 83, equal to 4.5 per cent.
Decrease in registered tonnage, 153,050, equal to 1.6 per cent.

Freight received and shipped.

[Tons of 2,000 pounds.]

Received.	Tons.	Shipments.	Tons.
Miscellaneous merchandise	9,000	Lumber (21,000 M feet)	31,500
Coal, hard and soft	7,100	Miscellaneous merchandise	125
Fish	1,200	Lath	2,100
Ties	250	Railroad ties	2,250
		Fish	200
Total	17,550	Total	36,975

Total freight received and shipped, 54,525 tons; decrease under 1906, 49,050 tons, equal to 47 per cent.
Total valuation, $2,539,780. Increase, $31,405, equal to one-tenth per cent.
Logs towed in, 3,900,000 feet B. M., valued at $58,500.

J J 11.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

The steamer *Alex Nimick*, owned by the Gilchrist Steamship Company of Cleveland, Ohio, was wrecked September 21, 1907, on the south shore of Lake Superior, about 11 miles west of Whitefish Point. The keeper at the life-saving station at Vermilion Point reported the wreck lying in 26 feet of water, with no part of her showing above water and the boilers and engines submerged about 2 feet.

It was at first thought the wreck was out of the way of navigation, but it now appears to be a menace to boats going to and from Marquette, and bids were invited for its removal, and opened May 15, 1908. The bids received were considered too high and informal offers were received June 1 for doing the work. The Bay City Wrecking and Salvage Company of Bay City, Mich., were the lowest bidders, at $500, and the contract awarded to them.

Contract papers were sent to the company, which is owned by W. B. Sphears, of Bay City, but up to June 30 nothing had been heard from Mr. Sphears, and the contract papers have not yet been returned.

The sum of $600 was allotted for the work.

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RÉSUMÉ.

Cost of operations on each work, both for fiscal year ending June 30, 1908, and since the commencement of operations, with total vessel freight and estimated value of same.

Name of work.	Amount expended during fiscal year ending June 30, 1908.	Vessel freight 1907.	
		Tons of 2,000 pounds.	Estimated value.
Grand Marais, Minn	$584.30	[a] 48,185	$1,471,555
Agate Bay, Minnesota	222.54	9,571,752	26,780,191
Duluth-Superior	392,069.86	[b] 34,786,705	287,529,694
Port Wing	4,977.71	106,971	973,660
Ashland, Wis	50,932.53	[c] 4,856,239	23,856,242
Ontonagon, Mich	13,770.72	[d] 7,332	345,493
Waterway across Keweenaw Point	10,346.64	[e] 2,448,041	101,774,806
Operating and care of same	12,900.00		
Marquette, Mich	1,408.05	1,934,738	8,909,051
Harbor of refuge, Marquette Bay		1,904,243	5,319,697
Grand Marais, Mich	755.07	54,525	2,539,780
Total	487,967.42	55,718,731	[f] 459,500,169

Name of work.	Date of commencement of improvement by the United States.	Total amount expended by the United States to June 30, 1908.	Vessel freight from commencement of improvement of work to January 1, 1908.		Ratio of total amount expended to estimated value.
			Tons of 2,000 pounds.	Estimated value.	
					Per cent.
Grand Marais, Minn	1880	$166,270.98	340,592	$9,362,034	1.77
Agate Bay, Minnesota	1887	250,880.07	78,573,569	187,570,368	.134
Duluth-Superior	1867	5,413,667.78	242,181,972	2,880,665,300	.19
Port Wing, Wis	1903	46,991.66	348,044	4,143,416	.113
Ashland, Wis	1887	400,087.16	69,948,720	508,885,924	.078
Ontonagon, Mich	1867	377,296.24	2,795,003	75,111,495	.502
Waterway across Keweenaw Point	1891	1,335,694.50	[g] 26,145,531	857,186,948	.155
Operating and care of same	1891	182,207.64			
Marquette, Mich	1867	669,282.51	39,265,107	174,574,816	.38
Harbor of Refuge, Marquette Bay	1897	57,597.34	17,195,088	45,440,094	.127
Grand Marais, Mich	1880	448,832.36	1,390,784	23,037,646	1.95
Total		9,348,808.24	478,184,410	4,765,978,041	.196

[a], [b], [c], [d], [e], Do not include logs as follows: [a], 4,500,000 feet; [b], 11,028,000 feet; [c], 52,760,000 feet; [d], 2,145,000 feet; [e], 9,659,000 feet; total, 80,092,000 feet.

[f], Does not include value of logs for 1907, amounting to $1,201,205.

[g], Largely freight passing through the canals. In 1907 the freight passing through the canals was 24,154,358 tons, and the local commerce of ports on the waterway amounted to 1,293,683 tons.

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APPENDIX K K.

IMPROVEMENT OF RIVERS AND HARBORS IN THE MILWAUKEE, WISCONSIN, DISTRICT.

REPORT OF MAJ. W. V. JUDSON, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Manistique Harbor, Michigan.
2. Gladstone Harbor, Michigan.
3. Menominee Harbor and River, Michigan and Wisconsin.
4. Oconto Harbor, Wisconsin.
5. Green Bay Harbor, Wisconsin.
6. Sturgeon Bay and Lake Michigan Ship Canal, and harbor of refuge connected therewith, Wisconsin.
7. Operating and care of Sturgeon Bay and Lake Michigan Ship Canal, Wisconsin.
8. Algoma Harbor, Wisconsin.
9. Kewaunee Harbor, Wisconsin.
10. Two Rivers Harbor, Wisconsin.
11. Manitowoc Harbor, Wisconsin.
12. Sheboygan Harbor, Wisconsin.
13. Port Washington Harbor, Wisconsin.
14. Harbor at Milwaukee, Wisconsin, including harbor of refuge.
15. Milwaukee Inner Harbor, Wisconsin.
16. Racine Harbor, Wisconsin.
17. Kenosha Harbor, Wisconsin.
18. Waukegan Harbor, Illinois.
19. Fox River, Wisconsin.
20. Operating and care of locks and dams on Fox River, Wisconsin.
21. Removing sunken vessels or craft obstructing or endangering navigation.

UNITED STATES ENGINEER OFFICE,
Milwaukee, Wis., July 15, 1908.

SIR: I have the honor to transmit herewith annual report for the works of river and harbor improvement in my charge for the fiscal year ending June 30, 1908.

Very respectfully,

W. V. JUDSON,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

K K 1.

IMPROVEMENT OF MANISTIQUE HARBOR, MICHIGAN.

Operations during the fiscal year.—No construction work has been in progress. The necessary land having been donated to the United States as required by act approved March 3, 1905, proposals for building revetment and for dredging at the mouth of the Manistique River were opened June 22, 1908. The lowest bid received exceeded the amount available for this work, and all bids were rejected. The work will probably be readvertised in the near future.

Condition of the improvement.—No soundings have been taken in the channel since the completion of the survey of 1903. It is believed

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that the condition of the channel is practically the same as at th time, which is fully described in report on said survey, published Annual Report for 1904, Part 3, page 2869.

Remarks.—A revised project has been adopted as authorized b act of March 2, 1907, the general plan of which is shown on accom panying map of harbor. The estimated cost of the revised proje is $338,462.

For reasons stated in Annual Report for 1905, page 2014, it recommended that if the approved project of improvement is to carried out by the Government, the balance of the estimate remaini unappropriated and amounting to $288,462, be made available.

Money statement.

July 1, 1907, balance unexpended	$47,590.
June 30, 1908, amount expended during fiscal year for works of improvement	774.
July 1, 1908, balance unexpended	46,816.
Amount (estimated) required for completion of existing project	288,462.
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	288,462.

APPROPRIATIONS.

June 14, 1880	$5,0
March 3, 1881	1,0
March 3, 1905	25,0
March 2, 1907	25,0
Total	56,0

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 19

[Furnished by Mr. Walter I. Lillie, collector of customs, Grand Haven, Mich.]

Arrivals and departures of vessels.

Description.	Arrivals.	Depar tures.
Steam	39	
Sail	47	
Total	86	

By way of the harbor.

	Net ton
Shipments	99,2
Receipts	5,1
Total	104,4
Tonnage in calendar year ending December 31, 1906	92,9
Increase in 1907	11,5

Principal articles shipped.—Lumber, pig iron, and general merchandise.
Principal articles received.—Coal, grain, iron and steel, and general merchandise.

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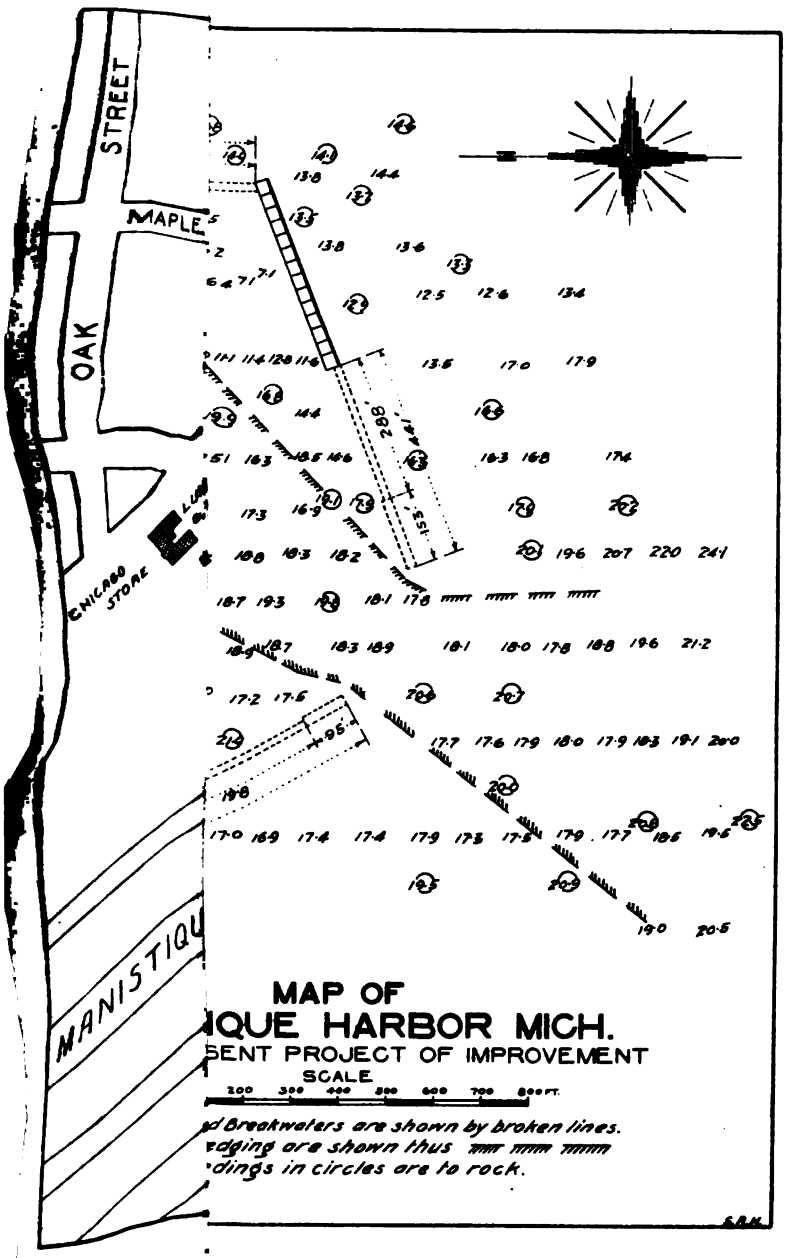

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K K 2.

IMPROVEMENT OF GLADSTONE HARBOR, MICHIGAN.

Operations during the fiscal year.—No work has been in progress.

Condition of the improvement.—Soundings completed January 9, 1907, indicate that no material shoaling has occurred over the area dredged in 1905.

Remarks.—The funds available are believed to be sufficient for maintenance until June 30, 1910; therefore no appropriation is recommended at the present time.

Money statement.

July 1, 1907, balance unexpended	$6,472.24
July 1, 1908, balance unexpended	6,472.24

APPROPRIATION.

March 3, 1905	$14,000

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by Mr. P. B. Hammond, agent Minneapolis, St. Paul and Sault Ste. Marie Railway Company, Gladstone, Mich.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	236	236
Sail	20	20
Total	256	256

By way of the harbor.

	Net tons.
Shipments	179,346
Receipts	369,924
Total	549,270
Tonnage in calendar year ending December 31, 1906	527,193
Increase in 1907	22,077

Principal articles shipped.—Canned goods, corn, flour, and lumber.

Principal articles received.—Coal, salt, steel rails, and general merchandise.

K K 3.

IMPROVEMENT OF MENOMINEE HARBOR AND RIVER, MICHIGAN AND WISCONSIN.

Operations during the fiscal year.—There were no operations other than those incident to care and superintendence of harbor.

Condition of the improvement.—Soundings completed February 15, 1908, indicate that considerable shoaling has occurred along the

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northerly side of the channel between the piers, and at several other places below Ogden Street Bridge. The maximum draft which can be carried is about 18 feet.

Remarks.—About 320 linear feet of the south pier and 600 linear feet of the north pier are in bad condition above the water line. These portions should be cut down and new superstructure built.

The following estimate is submitted:

For rebuilding 920 feet of pier above water line, at $15	$13,800
For dredging 20,000 cubic yards, at 20 cents	4,000
For contingencies and superintendence	2,200
Total	20,000

Money statement.

July 1, 1907, balance unexpended	$7,754.10
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1,809.39
July 1, 1908, balance unexpended	5,944.71
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	20,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

HARBOR.

March 3, 1871	$25,000.00	
June 10, 1872	25,000.00	
March 3, 1873	25,000.00	
June 23, 1874	25,000.00	
March 3, 1875	25,000.00	
August 14, 1876	8,000.00	
June 18, 1878	10,000.00	
March 3, 1879	10,000.00	
June 14, 1880	10,000.00	
March 3, 1881	12,000.00	
August 3, 1882	15,000.00	
July 5, 1884	10,000.00	
August 5, 1886	3,000.00	
August 11, 1888	9,000.00	
August 18, 1894	10,000.00	
June 3, 1896	7,150.00	
March 3, 1899	5,500.00	
		$234,650.00

RIVER.

September 19, 1890	54,000.00	
July 13, 1892	20,500.00	
August 18, 1894	6,000.00	
June 3, 1896	15,000.00	
March 3, 1899	18,920.00	
		114,420.00

HARBOR AND RIVER.

June 13, 1902	50,350.00
March 2, 1907	5,000.00
Miscellaneous receipts credited to appropriations	3,514.17
Total	407,934.17

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COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by the mayor, Menominee, Mich.; Mr. C. I. Cook, Menominee, Mich.; Mr. John S. Peterson, deputy collector of customs, Marinette, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	76	77
Sail	132	131
Total	208	208

By way of the harbor.

	Net tons.
Shipments	62,776
Receipts	194,238
Total	257,014

Principal articles shipped.—Fish, lath, lumber, salt, and general merchandise.
Principal articles received.—Coal and coke, cement, stone, fish, sugar beets, and general merchandise.

K K 4.

IMPROVEMENT OF OCONTO HARBOR, WISCONSIN.

Operations during the fiscal year.—There were no operations.

Condition of the improvement.—No material change in the condition of the improvement has probably occurred since June 30, 1902. (See Annual Report for 1902, p. 2046.)

Remarks.—In its present condition this harbor is of no value to commerce. It is believed that no benefit to commerce would result from maintaining the projected channel depth of 9 feet, it being utterly inadequate to the needs of navigation; therefore no estimate is submitted.

Money statement.

July 1, 1907, balance unexpended	$3,420.35
July 1, 1908, balance unexpended	3,420.35

APPROPRIATIONS.

March 3, 1881	$10.000	August 18, 1894	$3,000
August 2, 1882	15.000	June 3, 1896	4.000
July 5, 1884	15.000	March 3, 1899	15,000
August 5, 1886	8.000	June 13, 1902	3.000
August 11, 1888	20.000		
July 13, 1892	3,000	Total	96,000

K K 5.

IMPROVEMENT OF GREEN BAY HARBOR, WISCONSIN.

Operations during the fiscal year.—Dredging for restoration of outer channel in Green Bay was begun April 24 and completed June 10,

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1908. The work was done by the Government dredging plant, and 49,369 cubic yards was removed at a cost of 11.7 cents per cubic yard.

Condition of the improvement.—The outer channel, extending from mouth of Fox River to Tail Point light, is in fair condition, although there are still several shoals with depths of about 19 feet.

The inner channel in the Fox River below De Pere is in bad condition. Soundings taken in January, 1908, showed a shoaling over practically the entire channel, in some places as much as 4 feet, since the completion of the project in 1899.

Remarks.—For restoration and maintenance of channel to June 30, 1910, the following estimate is submitted:

For dredging 40,000 cubic yards in outer channel, at 20 cents	$8,000
For dredging 125,000 cubic yards in inner channel, at 22 cents	27,500
For minor repairs to revetments at Grassy Island	1,000
For contingencies and superintendence	3,500
Total	40,000

Money statement.

July 1, 1907, balance unexpended	$8,594.90
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	5,906.58
July 1, 1908, balance unexpended	2,688.32
July 1, 1908, outstanding liabilities	810.00
July 1, 1908, balance available	1,878.32
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	40,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 23, 1866	$30,500.00	August 11, 1888	$10,000.00
March 2, 1867	45,000.00	September 19, 1890	10,000.00
July 25, 1868 (allotted)	17,500.00	July 13, 1892	25,000.00
April 10, 1869 (allotted)	44,550.00	August 18, 1894	25,000.00
July 11, 1870	17,500.00	June 3, 1896	25,000.00
March 3, 1871	17,500.00	July 19, 1897	5,000.00
March 3, 1873	20,000.00	March 3, 1899	28,600.00
June 23, 1874	10,000.00	June 13, 1902	105,600.00
March 3, 1875	10,000.00	June 13, 1902 (allotment from emergencies, river and harbor, April 8, 1904)	2,328.39
August 14, 1876	8,000.00	March 3, 1905	10,000.00
June 18, 1878	5,000.00	March 2, 1907	5,000.00
March 3, 1879	4,000.00	Miscellaneous receipts credited to appropriation	52.50
June 14, 1880	6,000.00	Total	529,130.89
March 3, 1881	5,000.00		
August 2, 1882	20,000.00		
July 5, 1884	10,000.00		
August 5, 1886	7,000.00		

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COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907

[Furnished by Mr. George D. Nau, chairman harbor committee, Green Bay Business Men's Association, Green Bay, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	1,435	1,424
Sail	59	66
Total	1,494	1,490

By way of the harbor.

	Net tons.
Shipments	146,292
Receipts	692,092
Total	838,384
Tonnage in calendar year ending December 31, 1906	957,479
Decrease in 1907	119,095

Principal articles shipped.—Coal, lumber, grain, and general merchandise.
Principal articles received.—Coal, salt, wood, fish, iron, stone, and general merchandise.

K K 6.

IMPROVEMENT OF STURGEON BAY AND LAKE MICHIGAN SHIP CANAL AND HARBOR OF REFUGE CONNECTED THEREWITH, WISCONSIN.

Operations during the fiscal year.—Dredging on the shoal near Hills Point, which was in progress at the close of the fiscal year, was continued until November 12, 1907. The total amount dredged was 222,293 cubic yards, of which 171,019 cubic yards was removed during the fiscal year, at a cost of 9.4 cents per cubic yard. Dredging was resumed June 11, 1908, at a point westerly from the site of last season's operations, and continued until June 30, 1908. The total amount dredged was 15,086 cubic yards, at a cost of 16 cents per cubic yard. All of this dredging was done by the Government dredging plant.

Under contract with Rieboldt, Wolter & Co. for dredging in the vicinity of the bridge, work was begun August 12 and completed October 7, 1907. The total amount dredged was 82,721 cubic yards, at the contract price of 11 cents per cubic yard.

Condition of the improvement.—The entire channel has been dredged to the full projected depth, with the exception of a small amount of dredging yet to be done in the vicinity of Hills Point.

Remarks.—The act of March 3, 1905, directed the Secretary of War to determine whether for the completion of the project it was necessary to make any change in the bridge across Sturgeon Bay, and, if so, whether and to what extent the owners thereof had acquired vested or other rights in its present location so as to entitle them to damages by such change; and should he determine such change was necessary to complete the project, and that the owners had acquired vested or other rights in the present location of the bridge, he was authorized to acquire such property as might be necessary,

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and the sum of $50,000, or so much thereof as might be necessary, was appropriated for that purpose.

The act of March 2, 1907, provided that $20,000 of the aforesaid $50,000 might be expended for the maintenance of canal and harbor of refuge, including dredging near Hills Point. There is about $1,400 of said $20,000 yet available, which is sufficient for completing the dredging. Therefore no appropriation is recommended.

As the channel through the bridge has now been dredged to its full width and depth, and as it appears there are no vested or other rights to be acquired, it is recommended that such action be taken as may be necessary to return to the Treasury the $30,000 remaining from the appropriation of March 3, 1905.

Money statement.

July 1, 1907, balance unexpended		$58,114.26
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$23,514.52	
For maintenance of improvement	1,022.42	
		24,536.94
July 1, 1908, balance unexpended		33,577.32
July 1, 1908, outstanding liabilities		1,482.40
July 1, 1908, balance available		32,094.92

APPROPRIATIONS.

HARBOR OF REFUGE.

March 3, 1873	$40,000.00	
March 23, 1874	10,000.00	
June 18, 1878	30,000.00	
March 3, 1879	30,000.00	
June 14, 1880	10,000.00	
March 3, 1881	10,000.00	
August 2, 1882	20,000.00	
July 5, 1884	10,000.00	
August 5, 1886	5,000.00	
September 19, 1890	3,000.00	
July 13, 1892	5,000.00	
August 18, 1894	5,000.00	
June 3, 1896	5,000.00	
March 3, 1899	5,500.00	
		$188,500.00

CANAL.

July 13, 1892	$81,833.00	
August 18, 1894	20,000.00	
June 3, 1896	30,000.00	
March 3, 1899	30,000.00	
		161,833.00

CANAL AND HARBOR OF REFUGE.

June 13, 1902	$44,000.00	
March 3, 1903	178,000.00	
March 3, 1905	50,000.00	
		272,000.00
Miscellaneous receipts credited to appropriations		12,129.40
Total		634,462.40

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COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by Mr. Adam N. Dier, superintendent Sturgeon Bay and Lake Michigan Ship Canal Wisconsin.]

Arrivals and departures of vessels.

Class.	From Lake Michigan to Green Bay.		From Green Bay to Lake Michigan.		Total.	
	Number.	Net tons.	Number.	Net tons.	Number.	Net tons.
1907:						
Steam	811	589,559	753	506,097	1,564	1,095,656
Sail	185	23,373	166	16,412	351	39,785
Unrigged	208	182,902	205	185,477	413	368,379
Total	1,204	795,834	1,124	707,986	2,328	1,503,820
1906	1,221	780,136	1,145	698,146	2,366	1,478,282
1905	1,348	833,917	1,191	680,788	2,539	1,514,705
1904	1,297	716,748	1,156	631,943	2,453	1,348,691
1903	1,571	812,755	1,435	733,872	3,006	1,546,627
1902	1,708	868,961	1,592	771,753	3,300	1,640,714
1901	1,986	922,652	1,776	764,666	3,762	1,687,318

Navigation through the canal for the season of 1907 was resumed April 1, and was practically closed December 27, a period of two hundred and seventy-one days.

Average number of craft passing through the canal per day for the whole season (not including tugs) 8.22
Average net tons passing through the canal per day for the whole season (not including tonnage of tugs) 5,549.14
Average net tonnage—
Steam craft 700.55
Sail craft 113.35
Unrigged craft 891.93

Statement of freight and passengers carried through the canal during the calendar year ending December 31, 1907.

FROM LAKE MICHIGAN TO GREEN BAY.

Articles.	Net tons.	Articles.	Net tons.
Agricultural implements	992	Lumber	3,068
Beets (sugar)	350	Marble (finished)	125
Cement	21,233	Oils (all kinds)	4,991
Coal (all kinds)	115,873	Paper	375
Feathers	10	Poles (telegraph)	935
Fertilizer	1,164	Potatoes	30
Fish	1,420	Rosin	25
Flour	1,836	Salt	11,869
Fruit	960	Stone (Bedford)	5,012
Merchandise (general)	40,208	Sulphur	20
Glass	80	Ties (railroad)	7,042
Grain (all kinds)	2,700	Twine	30
Hay	464	Wood	7,130
Iron (manufactured)	16,242		
Iron (pig)	750	Total	245,684
Logs	750	Passengers (number)	6,359

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Statement of freight and passengers carried through the canal during the calendar year ending December 31, 1907—Continued.

FROM GREEN BAY TO LAKE MICHIGAN.

Articles.	Net tons.	Articles.	Net tons.
Bark	1,483	Lumber	294,086
Barrels (empty)	38	Merchandise (general)	18,189
Coal (all kinds)	9,639	Paper	1,737
Dairy products	706	Piles (round)	5,188
Fish	757	Poles (telegraph)	19,349
Fruit	656	Posts (fence and paving)	3,420
Grain (all kinds)	21,182	Potatoes	450
Hay	930	Salt	350
Hides	462	Stone (building and crib)	103,946
Iron (manufactured)	518	Ties (railroad)	10,635
Iron (ore)	119,086	Trees (Christmas)	258
Iron (pig)	3,075	Wood	14,207
Iron (scrap)	283		
Leather	120	Total	544,199
Logs	3,000	Passengers (number)	5,554

Total number of net tons of freight carried through the canal during the calendar year ending December 31, 1907 789,883

Total number of passengers carried through the canal during the calendar year ending December 31, 1907 11,918

Statement showing quantity and estimated value of freight carried through the canal during the calendar year ending December 31, 1907.

Items.	Quantity.	Price per unit.	Total valuation.
Agricultural implements ..... tons	992	$200.00	$198,400.00
Bark ..... cords	1,348	8.50	11,458.00
Barrels (empty) ..... number	1,500	1.10	1,650.00
Beets (sugar) ..... tons	350	9.00	3,150.00
Cement ..... do	21,233	30.00	636,990.00
Coal (all kinds) ..... do	125,512	4.50	564,804.00
Dairy products ..... do	706	300.00	211,800.00
Feathers ..... do	10	1,000.00	10,000.00
Fertilizer ..... do	1,164	25.00	29,100.00
Fish ..... do	2,177	120.00	261,240.00
Flour ..... barrels	18,361	5.00	91,805.00
Fruit ..... tons	1,616	50.00	80,800.00
Glass ..... do	80	250.00	20,000.00
Grain:			
Oats ..... bushels	140,000	.50	70,000.00
Peas ..... do	151,400	1.60	242,240.00
Wheat ..... do	570,000	.98	558,600.00
Hay ..... tons	1,394	14.00	19,516.00
Hides ..... do	462	120.00	55,440.00
Iron:			
Manufactured ..... do	16,822	100.00	1,682,200.00
Ore ..... do	119,081	3.00	357,243.00
Pig ..... do	3,825	15.65	59,861.25
Scrap ..... do	283	13.00	3,679.00
Leather ..... do	120	350.00	42,000.00
Logs ..... M feet B. M.	750	25.00	18,750.00
Lumber ..... do	138,489	30.00	4,154,670.00
Marble (finished) ..... tons	125	55.00	6,875.00
Merchandise (general) ..... do	58,377	175.00	10,215,975.00
Oils (all kinds) ..... barrels	22,184	9.50	210,748.00
Paper ..... tons	2,102	60.00	126,120.00
Piles (round) ..... number	10,375	6.00	62,250.00
Poles (telegraph) ..... do	118,724	4.00	474,896.00
Posts (fence and paving) ..... do	180,000	.25	45,000.00
Potatoes ..... bushels	16,000	.50	8,000.00
Rosin ..... tons	25	50.00	1,250.00
Salt ..... do	12,219	7.00	85,533.00
Stone (Bedford) ..... do	5,012	22.00	110,264.00
Stone (building and crib) ..... do	103,946	1.25	129,932.50
Sulphur ..... do	20	60.00	1,200.00
Ties (railroad) ..... number	252,525	.35	88,383.75
Trees (Christmas) ..... do	6,150	.75	4,612.50
Twine ..... tons	30	135.00	4,050.00
Wood ..... cords	8,535	6.00	51,210.00
Total			21,011,696.00

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Comparative statement of principal items of commerce through the canal for the calendar years 1906 and 1907.

Items.	Year.		Increase.	Decrease.
	1906.	1907.		
Vessels.....number..	2,366	2,328	.....	38
Tonnage.....tons..	1,478,282	1,503,820	25,538	.....
Tonnage (cargo).....do....	691,414	789,883	98,469	.....
Passengers.....number..	17,392	11,913	.....	5,479
Bark.....cords..	620	1,348	728	.....
Beets (sugar).....tons..	1,100	350	.....	750
Cement.....do....	8,046	21,233	13,187	.....
Coal (all kinds).....do....	109,653	125,512	15,859	.....
Dairy products.....do....	1,146	706	.....	440
Fish.....do....	2,306	2,177	.....	129
Flour.....barrels..	55,330	18,361	.....	36,969
Fruit.....tons..	162	1,616	1,454	.....
Grain (all kinds).....bushels..	768,413	861,400	92,987	.....
Hay.....tons..	6,250	1,394	.....	4,856
Hides.....do....	383	462	79	.....
Iron:				
Manufactured.....do....	12,509	16,822	4,313	.....
Ore.....do....	89,522	119,081	29,559	.....
Pig.....do....	2,273	3,825	1,552	.....
Leather.....do....	350	120	.....	230
Lumber.....M feet B. M..	132,140	138,489	6,349	.....
Merchandise (general).....tons..	63,391	58,377	.....	5,014
Oils (all kinds).....barrels..	2,355	22,184	19,829	.....
Paper.....tons..	1,337	2,102	765	.....
Piles (round).....number..	600	10,375	9,775	.....
Poles (telegraph).....do....	190,195	118,724	.....	71,471
Posts (fence and paving).....do....	88,100	180,000	91,900	.....
Salt.....tons..	23,945	12,219	.....	11,726
Stone (building and crib).....do....	72,461	108,958	36,497	.....
Ties (railroad).....number..	172,603	252,525	79,922	.....
Wood.....cords..	7,722	8,535	813	.....

Estimated value of freight carried through the canal during the calendar year ending December 31, 1907.....	$21,011,696.00
Estimated value of freight carried through the canal during the calendar year ending December 31,.1906.....	20,340,763.40
Increase in value of freight in 1907 as compared with 1906.....	670,932.60

Statement showing number and net tonnage of tugs passing through the canal during the calendar year ending December 31, 1907, and the number of vessels and unrigged craft towed during that time.

FROM LAKE MICHIGAN TO GREEN BAY.

Month.	Number.	Net tons.	Vessels towed.	Unrigged, towed.
January.....	19	380	.....	.....
February.....	11	220	.....	.....
March.....	24	439	.....	.....
April.....	51	1,243	2	4
May.....	43	1,152	2	9
June.....	41	1,648	6	17
July.....	16	786	4	15
August.....	28	1,553	4	16
September.....	28	1,093	.....	9
October.....	40	1,295	3	13
November.....	46	1,908	7	12
December.....	29	675	1	2
Total.....	376	12,392	29	97

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Statement showing number and net tonnage of tugs passing through the canal during the calendar year ending December 31, 1907, etc.—Continued.

FROM GREEN BAY TO LAKE MICHIGAN.

Month.	Number.	Net tons.	Vessels towed.	Unrigged, towed.
January	19	280	.....	.....
February	11	220	.....	.....
March	23	424	.....	.....
April	56	1,372	1	2
May	42	1,223	1	12
June	47	1,832	8	19
July	18	961	3	18
August	30	1,508	5	15
September	30	1,158	1	11
October	43	1,329	4	17
November	45	1,858	6	8
December	30	584	1	.....
Total	394	12,849	30	102

Total number of trips made through the canal by tugs for whole year	770
Total number of net tons	25,241
Total number of vessels towed	59
Total number of unrigged craft towed	199
Total number of vessels and unrigged craft towed	258
Average net tonnage of tugs stationed at canal	43.25
Average number passing through canal per day for whole year	2.11
Number of tugs stationed at canal engaged in local towing	4
Tonnage of tugs stationed at the canal engaged in local towing	173
Length of towing route from harbor entrance to mouth of Sturgeon Bay..miles..	8.75

Statement of class and net tonnage of vessels coming in from the lake via the canal during the year to seek shelter in Sturgeon Bay from storms.

Month.	Steam.		Sail.		Unrigged.		Total.	
	Number.	Net tons.	Number.	Net tons.	Number.	Net tons.	Number.	Net tons.
April	9	6,659	3	550	.....	.....	12	7,209
May	4	1,320	6	911	2	1,800	12	4,031
June	7	1,508	3	460	6	3,200	16	5,168
July	2	455	5	685	1	1,000	8	2,140
August	5	2,432	4	1,012	.....	.....	9	3,444
September	5	1,793	8	993	2	2,000	15	4,786
October	12	5,834	13	1,903	4	2,300	29	10,037
November	9	5,640	12	2,239	3	3,463	24	11,342
December	4	2,354	2	255	2	1,500	8	4,109
Total	57	27,995	56	9,008	20	15,263	133	52,266

Average net tonnage of steam craft sheltered	491.14
Average net tonnage of sail craft sheltered	160.86
Average net tonnage of unrigged craft sheltered	763.15

Class, quantity, and estimated value of cargoes carried by vessels while sheltered in Sturgeon Bay, season of 1907, only those coming in from the lake via the canal being included.

Item.	Quantity.	Price per unit.	Total valuation.
Agricultural implements.....tons..	93	$200.00	$18,600.00
Cement.....do....	1,752	30.00	52,560.00
Coal (all kinds).....do....	3,012	4.50	13,554.00
Fish.....do....	315	120.00	37,800.00
Fruit.....do....	411	50.00	20,550.00
Grain (wheat).....bushels..	90,000	.98	88,200.00
Iron (manufactured).....tons..	1,963	100.00	196,300.00
Iron (ore).....do....	4,680	3.00	14,040.00
Logs.....M feet B. M..	600	25.00	15,000.00
Lumber.....do....	6,855	30.00	205,650.00
Merchandise (general).....tons..	2,072	175.00	362,600.00
Poles (telegraph).....number..	7,800	4.00	31,200.00
Posts (fence and paving).....do....	28,300	.25	7,075.00
Salt.....tons..	1,610	7.00	11,270.00
Stone (building and crib).....do....	4,017	1.25	5,021.25
Ties (railroad).....number..	37,175	.35	13,011.25
Wood.....cords..	1,100	6.00	6,600.00

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Total estimated value of cargo carried by craft sheltered	$1,099,031.50
Total estimated value of vessels sheltered (based on Lloyd's valuation and is approximate)	1,502,963.00
Total value of vessels and cargo	2,601,994.50

Principal lines of transportation using the canal during the past year and number and net tonnage of boats comprising each line.

Name of line.	Port of hail.	Number of boats.	Net tonnage.
Toledo, Ann Arbor and Northern Michigan Railroad Co.	Frankfort, Mich	4	5,736
Lackawanna Transportation Co	Buffalo, N. Y	2	2,860
Wisconsin Transportation Co	Sheboygan, Wis	2	3,403
Lake Michigan Car Ferry Transportation Co	Chicago, Ill	4	3,582
Goodrich Transit Co	Duluth, Minn	7	5,023
Edward Hines Lumber Co	Chicago, Ill	8	2,953
Arthur Gurley Lumber Co	do	4	1,361
Nessen Transportation Co	Manistee, Mich	4	1,825
Leathem & Smith Towing and Wrecking Co	Sturgeon Bay, Wis	16	6,778
Sturgeon Bay Stone Co	do	6	2,030
Green Stone and Quarrying Co	do	2	1,500
Total		59	37,051

Of the above lines of transportation the Toledo, Ann Arbor and Northern Michigan Railroad Company, the Lackawanna Transportation Company, and the Goodrich Transit Company carry both freight and passengers, the other lines freight only.

In addition to the above lines of transportation, a large number of steam barges, sail vessels, and unrigged craft engaged in the general freighting business make use of the canal continually, going both ways, during the season of navigation, and considerable local business is done by tugs engaged in assisting sail vessels, unrigged craft, etc., through the canal.

K K 7.

OPERATING AND CARE OF STURGEON BAY AND LAKE MICHIGAN SHIP CANAL, WISCONSIN.

Operations during the fiscal year.—Operations have been confined to work incident to operating and care, examinations, keeping record of vessels, and tonnage passing through the canal, making necessary repairs to buildings and revetments, and dredging for maintenance of channel.

Under written proposal from Rieboldt, Wolter & Co., dredging for restoration of channel in harbor basin at entrance to the canal was begun October 10 and completed November 15, 1907. The total amount dredged was 11,965 cubic yards, at the agreed price of 15 cents per cubic yard.

Condition of the improvement.—There is a depth of over 21 feet below datum in the harbor and throughout the canal proper. From the westerly end of the canal to Green Bay there is a channel with a minimum width of 200 feet, through which a draft of 20 feet can be carried.

Proposed operations.—It is proposed to apply the funds for which an allotment is requested in maintenance, operating and care, and supervision of existing works.

In accordance with the provisions of section 4 of river and harbor act of July 5, 1884, a summary of expenditures is herewith given.

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Allotments from appropriation for operating and care of canals and other works of navi tion (indefinite), act of July 5, 1884, applied to Sturgeon Bay and Lake Michigan S Canal, Wisconsin.

May 5, 1893	$1,415.83	July 19, 1901	$8,501.
July 22, 1893	20,500.00	July 21, 1902	14,867.
July 19, 1894	10,301.13	July 13, 1903	7,937.
July 20, 1895	12,359.66	July 8, 1904	8,379.
August 10, 1896	17,513.84	July 13, 1905	12,018.
July 21, 1897	12,873.77	March 1, 1906	5,200.
July 28, 1898	27,435.79	July 16, 1906	31,519.
September 16, 1898	3,000.00	July 12, 1907	25,831.
July 24, 1899	23,551.29	Miscellaneous receipts credited to appropriations	1,483.
September 19, 1899	7,500.00		
January 27, 1900	1,000.00		
July 17, 1900	37,515.54	Total	290,706.

Summary of expenditures made from appropriation for operating and care of canals o other works of navigation (indefinite), act of July 5, 1884, applied to Sturgeon Bay a Lake Michigan Ship Canal, Wisconsin, during the fiscal year ending June 30, 1908.

Services	$14,840.
Supplies	3,917.
Materials	10,580.
Miscellaneous	738.
Total	30,077.

K K 8.

IMPROVEMENT OF ALGOMA HARBOR, WISCONSIN.

Operations during the fiscal year.—Sealed proposals for crib a breakwater construction, pile pier, dredging, etc., for constructing outer harbor in accordance with the approved project were open February 24, 1908. All bids received being in excess of the amou available, and of the amount for which it was believed the work cou be done by the United States, authority was granted to reject all bi and to do the work by hired labor.

The breakwater is to consist of concrete-steel caissons placed pile foundation. The caissons are being built at Kewaunee, Wi where the necessary plant has been established, the conditions the being more favorable than at Algoma. The construction of pla was begun March 21, and the first caisson was molded June 2, 19 At the close of the fiscal year six caissons have been molded, of wh four have been launched and one has been towed to Algoma. caisson has as yet been sunk.

About 25 per cent of the foundation piles for the caissons have be driven. The plank cribs are about 8 per cent and the pile pier abo 10 per cent completed.

Inasmuch as the concrete-steel caisson breakwater is of a no type, which promises to have an extended usefulness, a very compl report will be made at a later date. At this time it is sufficient to s that the plans are being executed at less cost than was originally e mated, and that no mishaps have occurred or unforeseen difficul arisen.

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Each caisson is 24 feet long, 15 feet wide, and 12 feet 4 inches high, and weighs about 120 tons. They are built on three sets of ways, one caisson every three days. Consequently a caisson is launched nine or ten days after it is formed. Each set of ways consists of three 12 by 12 inch stringers, supported on piles, with a slope of one on ten, and the ways terminate about 5 feet under water.

The caissons are roughly waterproofed before launching with thin cement grout containing lye and alum. There is no trouble from leakage, and no difficulties have arisen either in launching or towing. It is about 12 miles from Kewaunee, where the caissons are built, to Algoma Harbor.

A map of the harbor, showing the location of the breakwater and other work to be done, a drawing[a] of a concrete-steel caisson, and two photographs,[a] one showing caissons on launching ways in course of construction, the other the launching of a caisson, accompany this report.

Condition of the improvement.—The work now in progress contemplates providing a navigable channel and basin 16 feet deep during the present season.

Remarks.—The available funds are sufficient for completing the existing project, including the rebuilding of the superstructure on the north pier. It is estimated that there will be a balance of about $10,000 remaining after the project is completed, which will be sufficient for the maintenance of the harbor to June 30, 1910; therefore no appropriation is recommended.

Money statement.

July 1, 1907, balance unexpended		$46,604.29
Amount appropriated by sundry civil act approved May 27, 1908		100,000.00
		146,604.29
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$21,384.77	
For maintenance of improvement	6,604.29	
		27,989.06
July 1, 1908, balance unexpended		118,615.23
July 1, 1908, outstanding liabilities		12,288.62
July 1, 1908, balance available		106,326.61
July 1, 1908, amount covered by uncompleted contracts		18,860.25

APPROPRIATIONS.

March 3, 1871	$25,000	September 19, 1890	$6,000
June 10, 1872	25,000	July 13, 1892	7,000
March 3, 1875	25,000	August 18, 1894	5,000
August 14, 1876	8,000	June 3, 1896	5,000
June 18, 1878	8,000	March 3, 1899	13,000
March 3, 1879	7,000	June 13, 1902	10,000
June 14, 1880	7,000	March 2, 1907	43,000
March 3, 1881	8,000	May 27, 1908	100,000
August 2, 1882	12,000	Miscellaneous receipts credited to appropriations	220
July 5, 1884	15,000		
August 5, 1886	15,000		
August 11, 1888	5,000	Total	349,220

[a] Not printed.

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CONTRACTS IN FORCE.

For furnishing rubble stone at the following rates: 3,500 tons large stone, at $1.19 per ton of 2,000 pounds; 10,000 tons small stone, at 98 cents per ton of 2,000 pounds.
Name of contractor: Thomas H. Smith.
Date of contract: March 28, 1908.
Date of commencement: April 28, 1908.
Date of completion: November 30, 1909.

For furnishing sand and broken stone at the following rates: 1,045 cubic yards No. 1 concrete, 400 cubic yards No. 2 concrete, and 800 cubic yards No. 3 concrete, at $1.25 per cubic yard.
Name of contractor: Lake Shore Stone Company.
Date of contract: March 28, 1908.
Date of commencement: May 1, 1908.
Date of completion: November 30, 1909.

For furnishing cement at the following rate: 2,700 barrels, more or less, American Portland cement, at $1.15 per barrel.
Name of contractor: Universal Portland Cement Company.
Date of contract: March 28, 1908.
Date of commencement: April 12, 1908.
Date of completion: November 30, 1909.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by Mr. Martin Bretl, mayor of Algoma, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	166	166
Sail	149	148
Total	315	314

By all ways of transportation.

[About one-fourth of which is by way of the harbor.]

	Net tons.
Shipments	105,092
Receipts	54,467
Total	159,559
Tonnage in calendar year ending December 31, 1906	142,667
Increase in 1907	16,892

Principal articles shipped.—Cheese, hay, veneer goods, canned goods, grain, and general merchandise.
Principal articles received.—Coal and coke, lumber, stone, and general merchandise.

K K 9.

IMPROVEMENT OF KEWAUNEE HARBOR, WISCONSIN.

Operations during the fiscal year.—Dredging with the Government dredging plant for restoration of channel and for construction of launching ways to be used in connection with building concrete-steel caissons for use at Algoma and Manitowoc and for general repairs of floating plant was begun March 26 and completed April 21, 1908.

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The total amount dredged was 18,416 cubic yards, of which 10,534 cubic yards was removed from the channel at a cost of 9.7 cents per cubic yard, and 7,882 cubic yards was removed in construction of launching ways at a cost of 12.2 cents per cubic yard. The cost of the launching ways and incidental dredging has been paid for from appropriations other than for the improvement of Kewaunee Harbor. The ways were built at Kewaunee, as the Government owns a suitable site there; the locality is central, and transportation facilities are excellent.

Condition of the improvement.—The channel has the full projected depth of 15 feet for a width of 100 feet.

Remarks.—The superstructure of portions of the harbor piers is in a very dilapidated condition and should be rebuilt as soon as sufficient funds are available. About 1,200 feet of the north pier and 1,525 feet of the south pier should be cut down to the water surface and new superstructure built thereon.

Additional riprap along portions of the pile piers is needed, as well as additional stone in the piers themselves.

The following estimate is submitted:

For rebuilding 2,725 feet of pier above water line, at $15	$40,875
For 5,000 tons stone for riprap and pier filling, at $1.30	6,500
For 10,000 cubic yards dredging, at 15 cents	1,500
For contingencies, superintendence, and plant	5,125
Total	54,000

The present available balance is about $4,000. Therefore an appropriation of $50,000 is recommended.

Money statement.

July 1, 1907, balance unexpended	$6,466.47
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1,471.28
July 1, 1908, balance unexpended	4,995.19
July 1, 1908, outstanding liabilities	125.00
July 1, 1908, balance available	4,870.19
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	50,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

March 3, 1881	$5,000.00	March 3, 1899	$8,800.00
August 2, 1882	12,000.00	June 13, 1902	11,000.00
July 5, 1884	18,000.00	March 3, 1905	3,000.00
August 5, 1886	10,000.00	March 2, 1907	5,000.00
August 11, 1888	10,000.00	Miscellaneous receipts credited to appropriations	417.44
September 19, 1890	20,000.00		
July 13, 1892	30,000.00		
August 18, 1894	20,000.00	Total	178,217.44
June 3, 1896	25,000.00		

Appropriated by local authorities in 1881 and expended by the United States under the direction of the engineer officer in charge, $8,042.72.

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COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by Mr. O. H. Bruemmer, mayor of Kewaunee, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	390	391
Sail	11	11
Total	401	402

By way of the harbor.

	Net tons.
Shipments	42,186
Receipts	65,803
Total	107,989
Tonnage in calendar year ending December 31, 1906	139,297
Decrease in 1907	31,308

Principal articles shipped.—Grain, cheese, and general merchandise.
Principal articles received.—Coal and coke, cement, and general merchandise.

K K 10.

IMPROVEMENT OF TWO RIVERS HARBOR, WISCONSIN.

Operations during the fiscal year.—Under contract with August Rieboldt and Joseph Wolter for removing old pier, building pile pier, dredging, etc., work was begun May 7, 1908, and is in progress at the close of the fiscal year.

The rebuilding of the superstructure on outer end of the north pier by hire of labor and purchase of materials was begun June 24, 1908, and is in progress.

Condition of the improvement.—At the close of the fiscal year there was an available depth of only 12 feet over the bar at entrance. The contract now in force, however, provides for the formation of a navigable channel 16 feet deep during the present season.

Remarks.—The contract now in force provides for the completion of the present project during the present season. The work of rebuilding superstructure on the outer portions of the harbor piers will also be completed in 1908. The piers will then be in good condition, but additional riprap is needed, especially along the revetment at inner end of south pier, and portions of the piers will require refilling. It is probable that annual dredging will be required for maintenance of channel at the entrance.

The following estimate is submitted:

6,000 tons stone for riprap and pier filling, at $1.40	$8,400
10,000 cubic yards dredging, at 20 cents	2,000
Contingencies and superintendence	2,600
Total	13,000

On the completion of the contract now in force and the hired labor work now in progress it is estimated that there will be a balance of about $8,000 remaining from previous appropriations available for the foregoing work. An appropriation of $5,000 for maintenance is therefore recommended.

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Money statement.

July 1, 1907, balance unexpended		$88,956.36
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$5,248.22	
For maintenance of improvement	8,642.98	
		13,891.20
July 1, 1908, balance unexpended		75,065.16
July 1, 1908, outstanding liabilities		7,127.37
July 1, 1908, balance available		67,937.79
July 1, 1908, amount covered by uncompleted contracts		43,680.50
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		5,000.00

APPROPRIATIONS.

March 3, 1871	$25,000	August 11, 1888	$2,500
June 10, 1872	25,000	September 19, 1890	3,000
March 3, 1873	25,000	July 13, 1892	3,000
June 23, 1874	15,000	August 18, 1894	3,000
March 3, 1875	15,000	June 3, 1896	5,000
August 14, 1876	5,000	March 3, 1899	8,000
June 18, 1878	10,000	June 13, 1902	20,000
March 3, 1879	20,000	March 3, 1905	6,600
June 14, 1880	20,000	March 2, 1907	90,000
March 3, 1881	15,000		
August 2, 1882	15,000	Total	339,100
July 5, 1884	8,000		

CONTRACT IN FORCE.

For building pile pier, removing old pier, dredging, etc., material and labor to be paid for at the following rates: Removing old pier, at $12 per linear foot; furnishing round piles, at 28 cents per linear foot; making sheet piles of plank, to be furnished by United States, and driving same, at $12 per thousand feet B. M.; framing timber, to be furnished by United States, at $12 per thousand feet B. M.; wrought-iron or steel drift bolts, at 5 cents per pound; wrought iron or steel screw bolts and tie-rods, at 6 cents per pound; wrought-iron and wire spikes, at 5 cents per pound; stone, at $1.20 per ton of 2,000 pounds; dredging, at 11½ cents per cubic yard.

Name of contractors: August Rieboldt and Joseph Wolter.
Date of contract: September 13, 1907.
Date of approval: October 2, 1907.
Date of commencement: October 5, 1907.
Date of completion: April 5, 1909.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by Dr. J. R. Currens, mayor of Two Rivers, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	134	134
Sail	132	132
Total	266	266

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By way of the harbor.

	Net tons.
Receipts	63,580
Tonnage in calendar year ending December 31, 1906	35,425
Increase in 1907	28,155

Principal articles received.—Coal, lumber, and stave bolts.

K K 11.

IMPROVEMENT OF MANITOWOC HARBOR, WISCONSIN.

Operations during the fiscal year.—Work under the contract with Greiling Brothers for building 1,450 linear feet of pile pier and removing a portion of old north pier has been in progress during the fiscal year. The pile pier has been completed and about 700 feet of the old north pier has been removed.

Work under the contract with Great Lakes Dredge and Dock Company for moving cribs, building crib breakwater, and removing old pier and building pile pier has been in progress during the fiscal year. All the cribs have been moved, but two of them were thrown from their foundations during a severe storm on November 20, 1907, and completely wrecked. As these cribs had not been accepted by the United States, not having been completely filled, riprapped, and decked, as required under the contract, the contractors have built at their own expense two new cribs to take the place of those lost. The new cribs have not yet been sunk.

The project provides for rubble mounds capped with concrete-steel caissons to connect the crib breakwaters and pile piers on each side of the harbor. These rubble mounds are being largely formed from stone taken from the old piers in course of demolition. The caissons are to be built at Kewaunee, Wis., by hired labor and use of the plant established there for that purpose (see pp. 1954, 1957), after which they are to be towed to Manitowoc and sunk in position. The construction of these caissons has not yet been begun.

Condition of the improvement.—The entrance channel has the projected depth of 20 feet for a minimum width of about 100 feet.

Remarks.—The contracts now in force provide for the completion of the project with the exception of the rubble-mound concrete-steel caisson breakwaters. It is believed that the available funds are sufficient for completing the entire project and for maintenance of the harbor to June 30, 1910, therefore no appropriation is recommended at this time.

Money statement.

July 1, 1907, balance unexpended		$200,540.73
Amount appropriated by sundry civil act approved May 27, 1908		270,500.00
		471,040.73
June 30, 1908, amount expended during fiscal year for maintenance of improvement		144,904.29
July 1, 1908, balance unexpended		326,136.44
July 1, 1908, outstanding liabilities		13,751.49
July 1, 1908, balance available		312,384.95
July 1, 1908, amount covered by uncompleted contracts		164,330.07
Amount (estimated) required for completion of existing project		5,500.00

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APPROPRIATIONS.

August 30, 1852	$8,000.00	July 5, 1884	$15,000.00
June 23, 1866	52,000.00	August 5, 1886	15,000.00
March 2, 1867	45,000.00	August 11, 1888	8,000.00
July 25, 1868 (allotted)	17,500.00	September, 19, 1890	8,000.00
April 10, 1869 (allotted)	17,820.00	July 13, 1892	28,000.00
July 11, 1870	20,000.00	August 18, 1894	20,000.00
March 3, 1871	11,000.00	June 3, 1896	44,440.00
March 3, 1873	20,000.00	March 3, 1899	3,300.00
June 23, 1874	10,000.00	June 13, 1902	45,000.00
March 3, 1875	10,000.00	March 3, 1905	110,000.00
August 14, 1876	8,000.00	March 2, 1907	100,000.00
June 18, 1878	15,000.00	May 27, 1908	270,500.00
March 3, 1879	6,500.00	Miscellaneous receipts credited to appropriations	252.72
June 14, 1880	7,000.00		
March 3, 1881	4,000.00		
August 2, 1882	10,000.00	Total	929,312.72

CONTRACTS IN FORCE.

For removing old piers and building pile piers, material and labor to be paid for at the following rates: White-pine timber, at $45 per thousand feet B. M.; removing old crib piers, at $11 per linear foot; round piles, at 30 cents per linear foot; sheet piling, at $40 per thousand feet B. M.; Douglas or Oregon fir timber, at $45 per thousand feet B. M.; pine plank, at $40 per thousand feet B. M.; wrought-iron driftbolts, at 5 cents per pound; wrought-iron screw bolts and tie-rods, at 6 cents per pound; wrought-iron and wire spikes, at 6 cents per pound; stone, at $1 per ton of 2,000 pounds.

Name of contractor: Greiling Brothers.
Date of contract: August 18, 1906.
Date of approval: August 27, 1906.
Date of commencement: September 29, 1906.
Date of completion: November 30, 1907.

Supplemental agreement modifying contract dated August 18, 1906, for removing old piers and building pile piers; material and labor to be paid for at the following rates: Removing old crib piers forming that portion of the present north pier, covered by original contract, at $11 per linear foot; removing old crib piers forming that portion of the north pier lying to the eastward of the portion of old north pier, covered by the original contract, at $15 per linear foot; white-pine timber, at $49.50 per thousand feet B. M.; Douglas or Oregon fir timber, at $49.50 per thousand feet B. M.; longleaf yellow or southern pine timber, at $49.50 per thousand feet B. M.; round piles, at 33 cents per linear foot; sheet piling, at $44 per thousand feet B. M.; pine plank, at $44 per thousand feet B. M.; wrought-iron or steel driftbolts, at 5½ cents per pound; wrought iron or steel screw bolts and tie-rods, at 6.6 cents per pound; wrought-iron and wire spikes, at 6.6 cents per pound; stone, at $1.10 per ton of 2,000 pounds.

Name of contractor: Greiling Brothers.
Date of contract: March 9, 1907.
Date of approval: March 30, 1907.
Date of commencement: May 5, 1907.
Date of completion: Pile pier January 5, 1908; north pier eight months after notice that work can be done, exclusive of months of December, January, February, and March.

For moving cribs, building crib breakwater, removing old pier and building pile pier, material and labor to be paid for at the following rates:

MOVING CRIBS.

Removing and resetting 100-foot by 24-foot cribs, at $12,000 each.

BUILDING CRIBS.

Framing timber and plank to be furnished by the United States, at $10 per thousand feet B. M.; wrought-iron or steel driftbolts, at 5 cents per pound; wrought-iron or steel screw bolts, at 5 cents per pound; wrought-iron and wire spikes, at 5 cents per pound; stone, at $1.40 per ton of 2,000 pounds; foundation piles, at $20 each.

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REMOVING OLD PIER AND BUILDING PILE PIER.

Removing old 24-foot crib pier, at $20 per linear foot; removing old 20-foot crib pier, at $18 per linear foot; round piles, at 33 cents per linear foot; making and driving sheet piles, plank furnished by the United States, at $15 per thousand feet B. M.; framing timber and plank furnished by the United States, at $20 per thousand feet B. M.; wrought-iron or steel driftbolts, at 5 cents per pound; wrought-iron or steel screw bolts and tie-rods, at 5 cents per pound; wrought-iron and wire spikes, at 5 cents per pound; stone, at $1.40 per ton of 2,000 pounds.

Name of contractor: Great Lakes Dredge and Dock Company.
Date of contract: May 7, 1907.
Date of approval: May 16, 1907.
Date of commencement: June 17, 1907.
Date of completion: November 30, 1908.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by the Mayor of Manitowoc, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	1,572	1,[illegible]
Sail	164	[illegible]
Total	1,736	1,[illegible]

By way of the harbor.

	Net tons.
Shipments	1,025,953
Receipts	1,727,645
Total	2,753,598
Tonnage in calendar year ending December 31, 1906	1,202,170
Increase in 1907	1,551,428

Principal articles shipped.—Lime and cement, coal, grain, and general merchandise.
Principal articles received.—Coal and coke, lime and cement, and general merchandise.

K K 12.

IMPROVEMENT OF SHEBOYGAN HARBOR, WISCONSIN.

Operations during the fiscal year.—Work under the contract with Burk, Smith & Nelson for extending the breakwater landward 196 feet was begun November 5, 1907, and is in progress at the close of the fiscal year. The crib constituting the extension was sunk June 29, 1908, but has not yet been accepted.

Under contract with Great Lakes Dredge and Dock Company dredging for restoration of channel was begun June 23, 1908, and is in progress at the close of the fiscal year. The dredging is being done at a cost of $21.50 per hour for actual time of dredging. At the close of the fiscal year 7,622 cubic yards had been dredged at a cost of 19.4 cents per cubic yard.

Minor repairs have been made to the decking of the breakwater.

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Condition of the improvement.—The channel between the piers has a depth of 20 feet and a minimum width of 120 feet. Dredging now in progress will increase this width to about 200 feet.

Remarks.—About 800 feet of the north pier and 2,100 feet of the south pier are in bad condition above the water line. But as the present project contemplates the ultimate removal of a portion of these piers, it is recommended that nothing be done to them at the present time, except to make such temporary repairs as may be necessary to preserve them from demolition by storms.

When the further improvement of this harbor is undertaken it is recommended that the north breakwater be extended to the shore and that the present north pier be removed in whole or in part before undertaking the construction of the south breakwater. The latter should not be begun until the necessity for it is demonstrated. It is believed the partial improvement now suggested will fully satisfy all the necessities of navigation. If this plan be adopted, provision should be made for thoroughly rebuilding the south pier at the same time.

No estimate for the work above outlined is submitted at this time, but there are sufficient data on hand to prepare it whenever desired.

A large amount of stone is needed for riprap around the breakwater and outer ends of the piers and for filling cribs where excessive settlements have occurred. Minor repairs to the breakwater will be required from time to time. Annual dredging is necessary to preserve the projected depth of channel.

The following estimate is submitted:

6,500 tons stone for breakwater, at $1.50	$9,750
4,500 tons stone for harbor piers, at $1.50	6,750
Minor repairs to breakwater	1,000
Temporary repairs to harbor piers	5,000
Contingencies and superintendence	4,500
Total	27,000

It is estimated that there will be an available balance of about $10,000 after the completion of the present contracts; therefore an appropriation of $17,000 is recommended for maintenance to June 30, 1910.

Money statement.

July 1, 1907, balance unexpended		$49,906.53
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$11,730.02	
For maintenance of improvement	1,926.27	
		13,656.29
July 1, 1908, balance unexpended		36,250.24
July 1, 1908, outstanding liabilities		2,669.98
July 1, 1908, balance available		33,580.26
July 1, 1908, amount covered by uncompleted contracts		15,519.00
Amount that can be profitably expended in the fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908		17,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

August 30, 1852	$10,000.00	August 5, 1886	$15,000.00
June 28, 1864 (allotted)	10,000.00	August 11, 1888	15,000.00
June 23, 1866	47,598.91	September 19, 1890	15,000.00
March 2, 1867	8,000.00	July 13, 1892	25,000.00
April 10, 1869 (allotted)	14,850.00	August 18, 1894	25,000.00
July 11, 1870	15,000.00	June 3, 1896	26,000.00
March 3, 1871	15,000.00	March 3, 1899	28,400.00
June 10, 1872	18,000.00	June 6, 1900	52,000.00
March 3, 1873	10,000.00	June 13, 1902	90,000.00
June 23, 1874	10,000.00	March 3, 1905	18,000.00
March 3, 1875	12,000.00	March 3, 1905 (allotted Aug. 23, 1906)	3,819.21
August 14, 1876	6,000.00	March 2, 1907	40,000.00
June 18, 1878	4,000.00	Miscellaneous receipts credited to appropriations	151.34
March 3, 1879	3,000.00		
June 14, 1880	7,000.00	Total	626,819.46
March 3, 1881	25,000.00		
August 2, 1882	30,000.00		
July 5, 1884	28,000.00		

CONTRACT IN FORCE.

For building 196 feet of crib breakwater, material and labor to be paid for at the following rates: Framing timber and plank to be furnished by the United States, at $9.20 per thousand feet B. M.; wrought-iron or steel driftbolts, at 4 cents per pound; wrought-iron or steel screw bolts and tie-rods, at 4 cents per pound; wrought-iron and wire spikes, at 5 cents per pound; stone, at $1.35 per ton of 2,000 pounds.

Name of contractor: Burk, Smith & Nelson.
Date of contract: May 11, 1907.
Date of approval: June 6, 1907.
Date of commencement: July 6, 1907.
Date of completion: September 6, 1908.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by the mayor of Sheboygan, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	509	511
Sail	186	185
Total	695	696

By way of the harbor.

	Net tons.
Shipments	609,524
Receipts	650,426
Total	1,259,950
Tonnage in calendar year ending December 31, 1906	542,337
Increase in 1907	717,613

Principal articles shipped.—Coal, cheese, furniture, wood, and general merchandise.
Principal articles received.—Coal and coke, lumber, salt, stone, wood, and general merchandise.

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K K 13.

IMPROVEMENT OF PORT WASHINGTON HARBOR, WISCONSIN.

Operations during the fiscal year.—Under contract with the Great Lakes Dredge and Dock Company, dredging for restoration of channel was begun June 18 and completed June 22, 1908. The total amount dredged was 4,056 cubic yards, at a cost of 22 cents per cubic yard.

Condition of the improvement.—The channel between the piers has a depth of 13 feet for a width of about 160 feet. The depth in the west basin is 13 feet and in the north basin about 12½ feet.

Remarks.—At the present time the value to commerce of a 13-foot harbor on the Great Lakes is entirely incommensurate with the cost of maintenance. To be accessible to even the smaller available vessels a harbor should have a depth of at least 16 feet. It would be unwise to increase the depth of Port Washington harbor to 16 feet in its present condition, as much trouble is now experienced from wave action within the harbor during storms, and any increase in depth would increase this trouble, probably to such extent as to make the harbor dangerous during storms to vessels tied up inside.

It is therefore recommended that Congress authorize an examination and survey of this harbor, with a view to determining what should be done.

The superstructure on 450 feet of the north pier and 550 feet of the south pier is in bad condition and should be rebuilt as soon as funds are available for that purpose. Dredging for maintenance of channel is required annually.

The following estimate is submitted:

For rebuilding 1,000 feet superstructure, at $15	$15,000
For 10,000 cubic yards dredging, at 22 cents	2,200
For contingencies, superintendence, etc	1,800
Total	19,000

There is an available balance of about $3,000 remaining from previous appropriations, therefore an appropriation of $16,000 is recommended.

Money statement.

July 1, 1907, balance unexpended	$3,468.89
June 30, 1908, amount expended during fiscal year for maintenance of improvement	446.79
July 1, 1908, balance unexpended	3,022.10
July 1, 1908, outstanding liabilities	910.58
July 1, 1908, balance available	2,111.52
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	16,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

July 11, 1870	$15,000.00	August 5, 1886	$5,000.00
March 3, 1871	15,000.00	September 11, 1888	5,000.00
June 10, 1872	15,000.00	September 19, 1890	3,000.00
March 3, 1873	15,000.00	July 13, 1892	6,500.00
June 23, 1874	10,000.00	August 18, 1894	5,000.00
March 3, 1875	10,000.00	June 3, 1896	5,500.00
August 14, 1876	8,000.00	March 3, 1899	4,400.00
June 18, 1878	5,000.00	June 13, 1902	6,000.00
March 3, 1879	7,500.00	Miscellaneous receipts credited to appropriations	68.25
June 14, 1880	20,000.00		
March 3, 1881	17,000.00		
August 2, 1882	17,000.00	Total	204,968.25
July 5, 1884	10,000.00		

CONTRACTS IN FORCE.

(See under Waukegan Harbor, page 1976.)

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1906

[Furnished by Dr. R. E. Maercklein, mayor of Port Washington, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	1,230	1,23
Sail	112	11
Total	1,342	1,34

By way of the harbor.

	Net tons
Shipments	12,33
Receipts	37,72
Total	50,05
Tonnage in calendar year ending December 31, 1906	49,45
Increase in 1907	60

Principal articles shipped.—Brick, chairs, hay, and lumber.
Principal articles received.—Coal and coke, lumber, wood, and general merchandise.

K K 14.

IMPROVEMENT OF HARBOR AT MILWAUKEE, WISCONSIN, INCLUDING HARBOR OF REFUGE.

Operations during the fiscal year.—Work under the contract with Mr. W. H. Gillen for construction of concrete superstructure on breakwater has been in progress, and during the fiscal year 1,940 linear feet of superstructure has been completed, leaving about 1,860 linear feet yet to be built.

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Work under the contract with The Edward Gillen Dock, Dredge and Construction Company for extending breakwater 980 feet has been in progress during the fiscal year. About 75 per cent (27,641 tons) of the stone foundation is in place. Two cribs, each 196 feet long, are ready for sinking, but no crib has yet been sunk.

Condition of the improvement.—The harbor channel has the required depth of 21 feet for a minimum width of 150 feet.

Remarks.—The contracts now in force provide for the completion of the existing project, except for rebuilding the south pier. The funds available are sufficient for the completion of the project and for maintenance until June 30, 1910, therefore no appropriation is recommended.

Money statement.

July 1, 1907, balance unexpended	$234,388.24
Miscellaneous receipts	3,391.66
Amount appropriated by sundry civil act approved May 27, 1908	392,000.00
	629,779.90
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	161,847.04
July 1, 1908, balance unexpended	467,932.86
July 1, 1908, outstanding liabilities	20,707.63
July 1, 1908, balance available	447,225.23
July 1, 1908, amount covered by uncompleted contracts	265,170.03

APPROPRIATIONS.

STRAIGHT CUT.

August 30, 1852	$15,000.00
March 3, 1853	163.94
June 23, 1866	48,283.51
April 10, 1869 (allotted)	35,640.00
July 11, 1870	40,000.00
March 3, 1871	38,000.00
March 3, 1873	10,000.00
June 23, 1874	10,000.00
March 3, 1875	25,000.00
August 14, 1876	26,000.00
June 18, 1878	15,000.00
March 3, 1879	7,500.00
June 14, 1880	10,000.00
March 3, 1881	8,000.00
August 2, 1882	10,000.00
August 5, 1886 (from appropriation for harbor of refuge)	4,737.91
August 11, 1888	10,000.00
March 17, 1890 (special act)	6,100.00
September 19, 1890	6,000.00
July 13, 1892	14,000.00
August 18, 1894	7,000.00
June 3, 1896	7,000.00
March 3, 1899	26,000.00
Total expended at old river mouth and straight cut	429,825.36
Expended at former mouth of Milwaukee River	50,400.00
Total appropriated for straight cut (present harbor)	379,425.36

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HARBOR OF REFUGE.

March 3, 1881		$100,000.00
August 2, 1882		100,000.00
July 5, 1884		85,000.00
August 5, 1886	$60,000.00	
From which allotted to Milwaukee Harbor (August 25, 1886)	4,737.91	
		55,262.09
August 11, 1888		70,000.00
September 19, 1890		80,000.00
July 13, 1892		75,000.00
August 18, 1894		45,000.00
June 3, 1896		20,000.00
June 4, 1897		168,737.91
March 3, 1899		50,000.00
June 6, 1900		105,650.00
Miscellaneous receipts credited to appropriations		1,149.31
Total		955,799.31
Act of June 13, 1902 (harbor and harbor of refuge)		232,500.00
Act of March 3, 1905 (harbor and harbor of refuge)		150,000.00
Act of March 2, 1907 (harbor and harbor of refuge)		200,000.00
Act of May 27, 1908 (harbor and harbor of refuge)		392,000.00
Aggregate		2,360,124.67

CONTRACTS IN FORCE.

For the construction of concrete superstructure on breakwater, material and labor to be paid for at the following rates: Removing old 24-foot superstructure and leveling cribs, at $9 per linear foot; removing old 30-foot superstructure and leveling cribs, at $9 per linear foot; pine timber, at $60 per thousand feet B. M.; wrought-iron or steel driftbolts, at 5 cents per pound; round steel bars, at 5 cents per pound; concrete blocks, at $9.50 per cubic yard; concrete in place, at $8.50 per cubic yard.

Name of contractor: William H. Gillen.
Date of contract: May 11, 1907.
Date of approval: May 21, 1907.
Date of commencement: June 22, 1907.
Date of completion: November 30, 1909.

For building cribs for extension of breakwater, material and labor to be paid for at the following rates: Framing timber and plank, the timber and plank to be furnished by the United States, at $12 per thousand feet B. M.; wrought-iron or steel driftbolts, at 4 cents per pound; wrought-iron or steel screw bolts, at 5 cents per pound; wrought-iron and wire spikes, at 5 cents per pound; stone, at $1.40 per ton of 2,000 pounds.

Name of contractor: The Edward Gillen Dock, Dredge, and Construction Company.
Date of contract: May 11, 1907.
Date of approval: June 4, 1907.
Date of commencement: July 7, 1907.
Date of completion: November 30, 1909.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907

[Furnished by Mr. W. J. Langson, Secretary Chamber of Commerce, Milwaukee, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	5,144	5,093
Sail	401	369
Total	5,545	5,462

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By way of the harbor.	Net tons.
Shipments	953,861
Receipts	4,940,631
Total	5,894,492
Tonnage in calendar year ending December 31, 1906	6,204,024
Decrease in 1907	309,532

Principal articles shipped.—Beer, corn, flour, malt, mill stuffs, grain, and general merchandise.

Principal articles received.—Tan bark, coal, lumber, cement, salt, stone, iron ore, and general merchandise.

K K 15

IMPROVEMENT OF INNER HARBOR AT MILWAUKEE, WISCONSIN.

Operations during the fiscal year.—There have been no operations during the past fiscal year.

Condition of the improvement.—The condition of the channels is believed to be practically the same as set forth in report to which reference is made in current summary.

Remarks.—The law provides that no part of the appropriation shall be expended "unless the Secretary of War shall have satisfactory assurances that the city of Milwaukee will comply with the conditions imposed upon said municipality." The necessary land has not been donated to the United States, nor have any definite assurances been offered by the city that it will comply with the other conditions imposed by Congress.

At the request of the city of Milwaukee, the Secretary of War has approved certain lines along the Kinnickinnick and lower Milwaukee rivers "as representing limiting lines of improvement ordered by river and harbor act of March 3, 1905."

Money statement.

July 1, 1907, balance unexpended	$100,000
July 1, 1908, balance unexpended	100,000
Amount (estimated) required for completion of existing project	218,581

APPROPRIATION.

March 3, 1905	$100,000

K K 16.

IMPROVEMENT OF RACINE HARBOR, WISCONSIN.

Operations during the fiscal year.—Under contract with Mr. P. W. Galloway for extending the breakwater 196 feet landward, work was begun April 15, 1908, and is in progress at the close of the fiscal year. The extension will consist of one timber crib, 196 feet long, on stone foundation. The foundation is nearly prepared and the crib built, but not sunk.

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Under contract with the Great Lakes Dredge and Dock Company, dredging for restoration of channel was begun April 20 and completed May 29, 1908. The total amount dredged was 39,138 cubic yards, at a cost of 18.6 cents per cubic yard.

Minor repairs have been made to the south pier and to the breakwater.

Condition of the improvement.—The channel has a navigable depth of 20 feet for a width of about 180 feet.

Remarks.—About 300 feet of the north pier and 1,850 feet of the south pier are in bad condition above the water line. But as the present project contemplates the ultimate removal of a portion of these piers, it is recommended that nothing be done to them at the present time, except to make such temporary repairs as may be necessary to preserve them from demolition by storms.

When the further improvement of this harbor is undertaken, it is recommended that the north breakwater be extended to the shore and the present north pier removed in whole or in part before undertaking the construction of the south breakwater. The latter should not be begun until the necessity for it is demonstrated. It is believed the partial improvement now suggested will fully satisfy all the requirements of navigation. If this plan be adopted, provision should be made for thoroughly rebuilding the south pier at the same time.

No estimate for the work above outlined is submitted at this time, but there are sufficient data on hand to prepare it whenever desired.

A large quantity of stone is needed for riprap around the breakwater and outer ends of the harbor piers, and for filling cribs and piers where excessive settlements have occurred.

Annual dredging is necessary to preserve the projected depth of channel.

The Government dredging plant, consisting of one small dipper dredge of 2½ cubic yards capacity, with attendant scows and tug, is entirely inadequate to do all the dredging required annually at the various harbors in this district, and it is not always possible to get this class of dredging done promptly and at reasonable prices by dredging contractors.

Proposals were opened February 28, 1908, for hire of dredging plant for use at various harbors in this district. Although this work was advertised for a month and copies of the specifications were sent to all dredge contractors in this vicinity, only two proposals were received, one from the Great Lakes Dredge and Dock Company and one from the Two Rivers Dredging Company. The C. H. Starke Dredge and Dock Company, of Milwaukee, Wis., owners of a large dredging fleet, declined to bid. The proposal of the Great Lakes Dredge and Dock Company was accepted. At their price, $21.50 per hour, the dredging has cost from 16.3 cents to 30.3 cents per cubic yard, the average being 19.4 cents. Dredging was begun April 7, 1908, and up to June 30 a total of 78,096 cubic yards had been dredged from five harbors.

This dredging could have been done by a seagoing hopper dredge similar to the *General Gillespie* stationed on the east shore of Lake Michigan for much less cost and in about one-half the time. Such a dredge would cost $200,000, and would be available for all work of

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maintaining channel entrances at harbors on the west shore of Lake Michigan, including Chicago.

In this connection attention is invited to the report on this harbor published in Annual Report for 1907, page 1898.

The following estimate for maintenance of channel and existing works to June 30, 1910, is submitted:

5,000 tons stone for breakwater, at $1.60	$8,000
4,000 tons stone for harbor piers, at $1.60	6,400
Minor repairs to breakwater	1,000
Temporary repairs to harbor piers	5,000
Contingencies and superintendence	2,600
Total	23,000

It is estimated that there will be an available balance of about $3,000 after the completion of the present contract; therefore an appropriation of $20,000 is recommended.

Money statement.

July 1, 1907, balance unexpended		$49,083.62
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$6,046.68	
For maintenance of improvement	7,352.90	
		13,399.58
July 1, 1908, balance unexpended		35,684.04
July 1, 1908, outstanding liabilities		5,036.45
July 1, 1908, balance available		30,647.59
July 1, 1908, amount covered by uncompleted contracts		21,380.94
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		20,000.00

APPROPRIATIONS.

June 15, 1844	$12,500.00	July 5, 1884	$7,000.00
August 30, 1852	10,000.00	August 5, 1886	10,000.00
June 28, 1864	3,600.00	August 11, 1888	10,000.00
June 23, 1866	23,910.00	September 19, 1890	17,500.00
March 2, 1867	45,000.00	July 13, 1892	25,000.00
April 10, 1869 (allotted)	22,275.00	August 18, 1894	20,000.00
July 11, 1870	10,000.00	June 3, 1896	27,000.00
March 3, 1871	10,000.00	March 3, 1899	50,000.00
March 3, 1873	20,000.00	June 6, 1900	67,650.00
June 23, 1874	10,000.00	June 13, 1902	20,000.00
March 3, 1875	10,000.00	April 28, 1904 (allotment[a])	6,284.67
August 14, 1876	8,000.00	March 3, 1905	30,000.00
June 18, 1878	10,000.00	March 2, 1907	50,000.00
March 3, 1879	6,000.00	Miscellaneous receipts credited to appropriations	364.80
June 14, 1880	6,000.00		
March 3, 1881	6,000.00		
August 2, 1882	7,000.00	Total	561,084.47

[a] July 12 and 13 and October 11, 1904.

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CONTRACT IN FORCE.

[See also under Waukegan Harbor, page 1976.]

For building 196 feet of crib breakwater, material and labor to be paid for at the following rates: Framing timber and plank to be furnished by United States, at $11 per thousand feet B. M.; wrought iron or steel drift bolts, at 4 cents per pound; wrought iron or steel screw bolts, at 5 cents per pound; wrought iron and wire spikes, at 5 cents per pound; stone, at $1.48 per ton of 2,000 pounds.

Name of contractor: P. W. Galloway.
Date of contract: August 13, 1907.
Date of approval: August 24, 1907.
Date of commencement: September 27, 1907.
Date of completion: November 28, 1908.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by Mr. A. J. Horlick, mayor of Racine, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	1,380	1,377
Sail	61	63
Total	1,441	1,440

By way of the harbor.

	Net tons.
Shipments	103,750
Receipts	394,002
Total	497,752
Tonnage in calendar year ending December 31, 1906	162,247
Increase in 1907	335,505

Principal articles shipped.—Agricultural implements, iron and steel, stone, wagons and carriages, and general merchandise.

Principal articles received.—Coal and coke, lumber, iron and steel, stone, and general merchandise.

K K 17.

IMPROVEMENT OF KENOSHA HARBOR, WISCONSIN.

Operations during the fiscal year.—Under contract with Mr. P. W. Galloway for extending the breakwater 196 feet landward, work was begun June 15, 1908, and is in progress at the close of the fiscal year. The extension will consist of one timber crib 196 feet long on stone foundation. The foundation is partly prepared, and the construction of the crib is under way.

Under contract with the Great Lakes Dredge and Dock Company, dredging for restoration of channel was begun June 1, and completed June 17, 1908. The total amount dredged was 20,854 cubic yards, at a cost of 16.3 cents per cubic yard.

Condition of the improvement.—The channel has a navigable depth of 20 feet for a width of about 180 feet.

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Remarks.—About 150 feet of the north pier and 600 feet of the south pier are in bad condition above the water line. Stone is needed for riprap around the breakwater and outer ends of the harbor piers and for filling cribs and piers where excessive settlements have occurred. Annual dredging is necessary to preserve the projected depth of channel.

The following estimate for maintenance of channel and existing works to June 30, 1910, is submitted:

Rebuilding 750 linear feet superstructure, at $15	$11,250
5,000 tons stone, at $1.60	8,000
30,000 cubic yards dredging, at 20 cents	6,000
Minor repairs to piers and breakwater	1,000
Contingencies and superintendence	3,750
Total	30,000

As the work now in progress will practically exhaust the available funds, an appropriation of $30,000 is recommended.

Money statement.

July 1, 1907, balance unexpended		$40,091.82
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$5,982.65	
For maintenance of improvement	591.25	
		6,573.90
July 1, 1908, balance unexpended		33,517.92
July 1, 1908, outstanding liabilities		4,389.38
July 1, 1908, balance available		29,128.54
July 1, 1908, amount covered by uncompleted contracts		28,623.97
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908		30,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

March 15, 1844	$12,500.00	July 5, 1884	$5,000.00
March 3, 1845	15,000.00	August 5, 1886	5,000.00
August 13, 1852	10,000.00	August 11, 1888	7,500.00
June 23, 1866	75,461.41	September 19, 1890	17,500.00
April 10, 1869 (allotted)	5,346.00	July 13, 1892	15,000.00
July 11, 1870	10,000.00	August 18, 1894	15,000.00
March 3, 1871	10,000.00	June 3, 1896	24,000.00
June 10, 1872	10,000.00	March 3, 1899	50,000.00
June 23, 1874	10,000.00	June 6, 1900	135,000.00
March 3, 1875	15,000.00	June 13, 1902	5,000.00
August 14, 1876	8,000.00	March 3, 1905	*5,000.00
June 18, 1878	8,000.00	March 2, 1907	22,000.00
March 3, 1879	5,000.00	Miscellaneous receipts credited to appropriation	157.71
June 14, 1880	5,000.00		
March 3, 1881	5,000.00		
August 2, 1882	6,000.00	Total	516,465.12

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CONTRACT IN FORCE.

[See also under Waukegan Harbor, page 1976.]

For building 196 feet of crib breakwater, material and labor to be paid for at the following rates: Framing timber and plank, furnished by United States, at $11.50 per M feet B. M.; wrought-iron or steel driftbolts, at 4 cents per pound; wrought-iron or steel screw bolts and tie rods, at 5 cents per pound; wrought-iron and wire spikes, at 5 cents per pound; stone, at $1.55 per ton of 2,000 pounds.

Name of contractor: P. W. Galloway.
Date of contract: August 13, 1907.
Date of approval: August 26, 1907.
Date of commencement: September 27, 1907.
Date of completion: November 28, 1908.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by Mr. William H. Devos, collector of customs, Milwaukee, Wis.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.	Tonnage.
Steam	335	335	202,633
Sail	34	33	
Total	369	368	202,633

No report received of shipments and receipts for calendar year ending December 31, 1907.

Principal articles shipped.—Bark, sand and gravel, and general merchandise.
Principal articles received.—Coal and coke, lumber, and general merchandise.

K K 18.

IMPROVEMENT OF WAUKEGAN HARBOR, ILLINOIS.

Operations during the fiscal year.—Under contract with Mr. Adolph Green for building pile piers, removing old pier, and dredging, work was begun June 15, 1908, and is in progress at the close of the fiscal year. The construction materials, except stone, are on the ground, having been furnished to the contractor by the United States.

Under contract with the Great Lakes Dredge and Dock Company, dredging for removal of bar at entrance was begun April 7 and completed April 18, 1908. The total amount dredged was 6,426 cubic yards at a cost of 30.3 cents per cubic yard.

Condition of the improvement.—The channel has a navigable depth of 20 feet with a minimum width of about 80 feet at the inshore end of the north pier. The channel will be widened and deepened under the contract now in force.

Remarks.—Upon the completion of the work now in progress the piers and breakwater will be in good condition. Stone is needed, however, for riprap around the breakwater and outer ends of the harbor piers, and for filling cribs and piers where excessive settlements have occurred. It is probable that annual dredging will be required, especially on the bar which forms at the harbor entrance.

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The following estimate for maintenance of channel and existing works to June 30, 1908, is submitted:

5,500 tons stone for breakwater at $1.60	$8,800
4,500 tons stone for harbor piers, at $1.60	7,200
15,000 cubic yards dredging, at 30 cents	4,500
Minor repairs to piers and breakwater	1,000
Contingencies and superintendence	3,000
Total	24,500

It is estimated that there will be a balance of about $6,500 after the completion of the present contract; an appropriation of $18,000 is therefore recommended.

Money statement.

July 1, 1907, balance unexpended	$68,159.94
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	17,884.57
July 1, 1908, balance unexpended	50,275.37
July 1, 1908, outstanding liabilities	2,889.02
July 1, 1908, balance available	47,386.35
July 1, 1908, amount covered by uncompleted contracts	29,160.19
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	18,000.00

APPROPRIATIONS.

August 30, 1852, for breakwater (outer)	$15,000.00	April 28, 1904	$5,000.00
June 14, 1880	15,000.00	March 3, 1905	30,000.00
March 3, 1881	15,000.00	March 2, 1907	50,000.00
August 2, 1882	20,000.00	Total appropriation for harbor	660,500.00
July 5, 1884	20,000.00	Appropriation for outer breakwater (1852)	15,000.00
August 15, 1886	20,000.00		645,500.00
August 11, 1888	25,000.00	Miscellaneous receipts credited to appropriations	72.93
September 19, 1890	35,000.00	Total for present harbor	645,572.93
July 13, 1892	25,000.00		
August 18, 1894	20,000.00		
June 3, 1896	20,000.00		
March 3, 1899	5,500.00		
June 13, 1902	100,000.00		
March 3, 1903	240,000.00		

CONTRACT IN FORCE.

For building pile pier, removing old pier, and dredging, material and labor to be paid for at the following rates: Driving round piles, furnished by the United States, at 18 cents per linear foot; making and driving sheet piles, plank furnished by United States, at $19.25 per thousand feet B. M.; framing timber and plank, furnished by United States, for pile pier, at $24.50 per thousand feet B. M.; stone at $1.68 per ton of 2,000 pounds; removing part of old pier, at $14.60 per linear foot; dredging at 28 cents per cubic yard.

Name of contractor: Adolph Green.
Date of contract: May 12, 1908.
Date of approval: May 27, 1908.
Date of commencement: June 29, 1908.
Date of completion: February 28, 1909.

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IMPROVING VARIOUS HARBORS IN THIS DISTRICT.

For hire of dredging plant for use at various harbors on the west shore of Lake Michigan, to be paid for at the following rate: $21.50 per hour.
Name of contractor: Great Lakes Dredge and Dock Company.
Date of contract: March 13, 1908.
Date of commencement: April 7, 1908.
Date of completion: July 15, 1908.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Furnished by the Mayor of Waukegan, Ill.]

Arrivals and departures of vessels.

Description.	Arrivals.	Departures.
Steam	535	532
Sail	9	9
Total	544	541

By way of the harbor.

	Net tons.
Shipments	4,700
Receipts	380,286
Total	384,986
Tonnage in calendar year ending December 31, 1906	202,199
Increase in 1907	182,787

Principal articles shipped.—Coal and coke, grape sugar, and general merchandise.
Principal articles received.—Coal and coke, iron and steel, salt, and general merchandise.

K K 19.

IMPROVEMENT OF FOX RIVER, WISCONSIN.

Attention is invited to the report upon "Operating and care of locks and dams on Fox River, Wisconsin."

Navigation closed November 22, 1907, and reopened April 6, 1908.

Operations during the fiscal year.—The work consisted in constructing a turning basin and warehouse at Appleton, making slight repairs to Miller Bay breakwater; commencing the construction of a harbor at Brothertown; dredging Fond du Lac Harbor; dredging channel, Upper Fox River; rebuilding dredge *No. 5;* building a new 80-foot scow and two 40-foot ponton scows.

Widening canal at Appleton.—The canal above Lake street at Appleton was widened on the left side, providing room for boats to land and turn. The bank was sloped and paved with stone; the grounds were leveled off and seeded and the driveways covered with cinders; the old building on the grounds was converted into a public warehouse; a fence was built along the boundary on north and west sides.

Miller Bay.—The paving on the outer side of the breakwater was slightly repaired and riprapped with stone.

Brothertown Harbor.—The land required for the improvement was donated to the United States and the work of dredging an entrance

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channel and basin was commenced May 11, 1908. At the end of the fiscal year the channel had been dredged 50 feet wide and the work of widening the same to 100 feet and dredging out a basin was in progress.

Dredging Fond du Lac Harbor.—The work of redredging Fond du Lac Harbor, commenced during the last fiscal year, was continued. A channel 100 feet wide and 6 feet deep has been completed from Scott Street Bridge to the 7-foot contour in Lake Winnebago and a turning basin 200 feet wide has been dredged below the bridge.

Dredging Upper Fox River.—Dredging was continued from a point 3,240 feet below milepost 44 downstream to milepost 43, completing the dredging in the section between White River and Princeton locks on July 15, 1907. These mileposts record the distances above Oshkosh. In September, 1907, dredging above Princeton lock was commenced by the removal of two bars near milepost 55. Work was then commenced 400 feet above milepost 54 and continued downstream to 1,800 feet below milepost 54, when the dredge was withdrawn for the winter. In May, 1908, work was resumed by conveyor dredge. The channel was dredged from milepost 53 to Princeton lock; from 1,200 feet above milepost 59 to milepost 58 and from 1,700 feet above to 2,600 feet below milepost 62, where dredge is now working.

The dredging aggregates 173,900 cubic yards at a cost of 8.15 cents per cubic yard, including repairs to conveyor dredge plant.

Rebuilding dredge No. 5.—The hull of this dredge was rebuilt from the grubstrake up; the machinery was overhauled and repaired. A new boiler was purchased and installed.

Construction of 80-foot scow and two ponton scows.—A barge or scow 80 feet by 18 feet by 4 feet and two ponton scows 40 feet by 14 feet by 3 feet were built, the former to be used in the transportation of building material and coal for use of the dredges and the latter for anchorage of conveyor dredge.

Repairs of conveyor dredge.—A few minor changes and improvements and the necessary repairs to the machinery were made.

Remarks and recommendations.—Benefits to commerce are so small as to be incommensurate with either the initial cost of this improvement or the cost of its maintenance. It is strongly recommended that no funds for improvement be expended above Montello, as that portion of the river is unworthy of improvement. The sum appearing in the money statement as the "amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to balance unexpended July 1, 1908," will, it is expected complete the channel from Princeton lock to Montello.

Money statement.

July 1, 1907, balance unexpended		$82,259.97
Miscellaneous receipts		9.00
		82,268.97
June 30, 1908, amount expended during fiscal year, for works of improvement		29,710.60
July 1, 1908, balance unexpended		52,558.37
July 1, 1908, outstanding liabilities		2,680.27
July 1, 1908, balance available		49,878.10

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Amount (estimated) required for completion of existing project [a]	$175,353.36
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	75,000.00

APPROPRIATIONS.

March 2, 1867, for snag boat on Wisconsin River	$40,000.00
July 10, 1870, for improving Wisconsin River	100,000.00
June 10, 1872, for purchase of works on Fox River from Green Bay and Mississippi Canal Company	145,000.00
March 3, 1873, for improving Fox and Wisconsin rivers	300,000.00
June 23, 1874	300,000.00
March 3, 1875	500,000.00
August 14, 1876	270,000.00
June 18, 1878	250,000.00
March 3, 1879	150,000.00
June 14, 1880	125,000.00
March 3, 1881	125,000.00
August 2, 1882	200,000.00
July 5, 1884	160,000.00
August 5, 1886, for improving Fox River	56,250.00
August 11, 1888, for improving Fox River	100,000.00
September 19, 1890, for improving Fox River	100,000.00
July 13, 1892, for improving Fox River	75,000.00
August 18, 1894, for improving Fox River	37,500.00
June 3, 1896, for improving Fox River	37,500.00
March 3, 1899, for improving Fox River	27,500.00
June 13, 1902	70,000.00
March 3, 1905	35,000.00
March 2, 1907	35,000.00
Miscellaneous receipts credited to appropriations	9,179.74
Total	3,247,929.74

COMMERCIAL STATISTICS.

List of articles transported on Fox River, Wisconsin, during the season of 1907.

Articles.	Quantity.	Articles.	Quantity.
	Tons.		*Tons.*
Beer	112.00	Lumber	2,200.50
Brick	11,150.50	Paper	5.50
Cement	458.50	Potatoes	148.50
Coal	64,381.75	Power launches	207.00
Cord wood	4,633.00	Pulp wood	23,900.00
Cinders	232.00	Railroad ties	55.00
Drain tile	47.00	Salt	594.00
Flour, grain, and mill stuffs	3,634.00	Sand and gravel	31,155.00
General merchandise	3,469.75	Shingles and lath	353.75
Hay	1,180.00	Stone	11,597.25
Horses and cattle	18.00	Sugar	77.50
Lime	234.50		
Logs	128,785.50	Total	288,732.00
		Passengers	42,786

[a] Change in estimate approved by Chief of Engineers, June 4, 1908.—E. D. 7907/50.

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Number of lockages on Fox River, Wisconsin, for the calendar year 1907.

No.	Lock.	Lockages.	No.	Lock.	Lockages.
1	De Pere	1,298	16	Appleton second	616
2	Little Kaukauna	1,048	17	Appleton first	663
3	Rapide Croche	847	18	Menasha	1,319
4	Kaukauna fifth	799	19	Eureka	1,427
5	Kaukauna fourth	799	20	Berlin	734
6	Kaukauna third	798	21	White River	370
7	Kaukauna second	826	22	Princeton	558
8	Kaukauna first	834	23	Grand River	843
9	Little Chute fourth [a]	787	24	Montello	736
10	Little Chute third [a]	787	25	Governor Bend	746
11	Little Chute second	759	26	Fort Winnebago	1,765
12	Little Chute first (guard lock)		27	Portage	159
13	Cedars	723			
14	Appleton fourth	745		Total	[b] 21,632
15	Appleton third	646			

[a] Combined.
[b] There are many hundreds of small pleasure boats on Fox River and most of the lockages are incident to their passage.

K K 20.

OPERATING AND CARE OF LOCKS AND DAMS ON FOX RIVER, WISCONSIN.

Under an allotment from the indefinite appropriation for operating and care of canals and other works of navigation, there has been expended during the year ending June 30, 1908, the sum of $45,171.78.

The work accomplished has been dredging bars and channels; making repairs to locks, dams, and canal banks, dredges, boats, etc., as given below:

De Pere lock.—The coping timber, sheathing, and posts above the water and the concrete filling between coping timbers were renewed. The lock was provided with steel gate spars and concrete tripod platforms.

Little Kaukauna lock.—A leak in the left wall was closed with earth and the lock chamber was cleaned. The tool house was reshingled.

Little Kaukauna dam.—Slight repairs were made to the walk over sluiceways.

Rapide Croche lock.—The walls were repointed with Portland cement. The tripods were leveled up and adjusted. A stairway was built on the incline in front of lock house and a gravel walk was laid from the lock house to the lock.

Kaukauna fifth lock house.—The kitchen was replastered and woodwork repaired. Hard-wood floors were laid in kitchen, dining room, and pantry. Outside stairs were built below the house and a new outhouse built.

Kaukauna third and fourth locks.—Gas-pipe stanchions were placed under the valve platforms, replacing the old wooden supports, and other minor repairs were made.

Kaukauna second lock.—Three of the tripod platforms were replaced with concrete. The valves in lower gates were refitted. The lock house was reshingled and the storeroom ceiled up inside.

Kaukauna first lock.—The maneuvering gears for filling valves were provided with ratchets and dogs to hold valves when open.

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Kaukauna Canal bank.—The right bank of the canal was raised, sloped, and paved with stone from guard lock to Wisconsin Avenue Bridge.

Kaukauna dam.—The work of repairing the sluiceway abutments, commenced during the last fiscal year, was completed.

Little Chute combined locks.—The lower wing walls were repaired and raised. Four broken miter gears in valve maneuvering apparatus were replaced. Slight repairs were made to the retaining wall above the lock, the walls of the wasteweir ditch and the bridge crossing same. A fence was built across canal bank.

Little Chute second lock.—This lock was unwatered and repaired where damaged by ice. One concrete tripod platform was built. The valve maneuvering apparatus was remodeled. The valves in lower gates were refitted and repaired. The top arms of the gates were renewed. The right bank of canal below lock was repaired. A row-boat was built for lock master's use.

Little Chute guard lock.—The walls were backed with earth.

Little Chute dam.—Considerable decayed timber in the sluiceways and walk was renewed.

Cedars lock.—New fenders were placed on the gates. The maneuvering gears for filling valves were provided with ratchets and dogs to hold valves when open.

Cedars lock house.—The plastering was repaired. Eave troughs and conductor pipes were placed and a cistern and pump purchased and installed. Storm sash were provided for the windows.

Cedars dam.—This dam was backed with clay.

Appleton fourth lock.—Concrete tripod platforms were built. Eave troughs and conductor pipes were placed on lock house and a cistern and pump purchased and installed. The grounds around house were raised and seeded down. The roof of outhouse was shingled.

Appleton Canal bank.—The left bank of canal between the lower dam and the Fourth lock was raised and filled out to the revetment wall built during the last fiscal year. Other minor repairs were made.

Appleton second lock.—The lock house was moved across the canal to the right bank, a stone foundation and cellar built, and the grounds graded off. A cement floor was laid in cellar; a fence inclosing the United States property on right bank of canal between Lake street and South Division street was built.

Appleton first lock and house.—The valve maneuvering gears were supplied with ratchets and dogs to hold valves when open. A hard maple floor was laid in the kitchen and dining room of lock house. The roofs of timber shed, tool house, and outhouse were reshingled.

Appleton and Menasha dams.—New and heavier chains were placed on the steel sluice gates.

Menasha lock.—The old gates were rebuilt. Concrete tripod platforms were built at the upper end. Cement and gravel walks were built around lock and lock house.

Eureka lock.—Additional riprap was placed along the right bank of canal above lock.

Eureka lock house.—The house was painted both inside and out. Other minor repairs were made.

Berlin lock.—A fence was built around the barnyard and eave troughs and conductor pipes were placed on the warehouse.

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Shore protection above Berlin lock.—The old shore protection one-half mile above Berlin lock was repaired by placing additional riprap.

White River lock house.—The plastering was repaired and the storm shed was reshingled. The road from United States property to public highway was ditched and graded and three box culverts were made and placed therein.

Princeton lock and house.—The kitchen was replastered, the woodwork repainted, and other minor repairs were made. The artesian well was cleaned and the boundary line fence was rebuilt. A rowboat was built for use of lock master.

Grand River lock house.—This house was reshingled, the plastering ing was repaired, and new windows were provided. An addition was built on the upper side and other minor repairs were made.

Montello lock.—Four new snubbing posts were placed.

Montello dam.—The crest, apron, and sills were extensively repaired. The abutments were taken down and relaid in cement.

Governor Bend lock.—The gate valves were repaired and 4 new snubbing posts were placed.

Fort Winnebago lock.—The tripod sills were renewed and the valves repaired.

Portage lock.—The lower wing cribs and the stairs at lower end were repaired, and the lower right platform was rebuilt.

Dredging bars and channels.—To maintain a navigable channel and restore it to dimensions heretofore obtained, bars were removed on the Fox River at different places. The work accomplished was done by dredges *4*, *5*, and conveyor dredge, and aggregates 94,506 cubic yards, at a cost of $5,988.53. Adding 20 per cent for repairs and contingencies, the cost per cubic yard is about 7.6 cents.

Special repairs to plant.—The barge *Princeton* was repaired and painted.

Repairs of boats and dredges.—Numerous minor repairs were made to boats and dredges.

An itemized statement of the expenditures during the year, required by section 4 river and harbor act of July 5, 1884, is appended hereto.

List of allotments from appropriation for operating and care of canals and other works of navigation (indefinite), act of July 5, 1884, applied to Fox River, Wisconsin.

August 9, 1884	$54,000.00	May 29, 1900	$6,362.54
July 28, 1885	42,304.00	July 20, 1900	78,167.11
July 20, 1886	43,668.00	August 10, 1900	6,238.40
July 13, 1887	43,650.00	July 19, 1901	54,563.57
June 28, 1888	48,900.00	July 21, 1902	68,397.51
June 12, 1889	62,760.00	October 4, 1902	2,750.00
November 25, 1889	13,500.00	July 18, 1903	48,776.32
June 19, 1890	69,005.00	July 8, 1904	31,117.60
April 28, 1891	63,980.00	July 13, 1905	53,604.16
July 1, 1892	40,000.00	July 17, 1906	82,432.33
July 15, 1893	32,430.55	September 27, 1906	3,000.00
July 26, 1894	30,882.37	June 11, 1907	5,000.00
July 20, 1895	61,279.63	July 12, 1907	47,522.98
October 6, 1896	62,665.03	May 18, 1908	3,662.50
July 30, 1897	60,009.62	Miscellaneous receipts credited to appropriations	3,157.75
July 29, 1898	63,869.10		
October 4, 1898	3,000.00		
July 22, 1899	72,911.29		
January 6, 1900	2,000.00	Total	1,365,567.36

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Summary of expenditures made from appropriation for operating and care of canals and other works of navigation (indefinite), act of July 5, 1884, applied to Fox River, Wisconsin, during the fiscal year ending June 30, 1908.

Services	$31,586.48
Supplies	5,450.85
Materials	7,005.66
Miscellaneous	1,128.79
Total	45,171.78

OPERATING AND CARE OF CANALS AND OTHER WORKS OF NAVIGATION, APPLIED TO FOX RIVER, WISCONSIN.

[Section 4 of river and harbor act of July 5, 1884.]

Detailed statement of expenditures for fiscal year ending June 30, 1908.

Character of works, etc.	Item of expense.	Amount.	Total.
Repairs of De Pere lock	Materials	$1,023.16	
Do	Labor and transportation	1,152.62	$2,175.78
Repairs of Rapide Croche lock	Materials	2.50	
Do	Labor and transportation	87.44	89.94
Repairs of Kaukauna fifth lock house	Materials	67.93	
Do	Labor and transportation	61.49	129.42
Repairs of Kaukauna third and fourth locks	do		99.66
Repairs of Kaukauna second lock and house	Materials	371.33	
Do	Labor and transportation	45.12	416.44
Repairs of Kaukauna canal bank	do		310.14
Repairs of Kaukauna dam	do		19.90
Repairs of Little Chute combined locks	Materials	31.05	
Do	Labor and transportation	191.94	222.99
Repairs of Little Chute second lock	Materials	473.71	
Do	Labor and transportation	613.60	1,087.31
Repairs of Little Chute guard lock and dam	do		251.55
Repairs of Cedars lock and dam	Materials	28.34	
Do	Labor and transportation	458.44	486.78
Repairs of Appleton fourth lock and canal bank	Materials	315.73	
Do	Labor and transportation	1,524.69	1,840.42
Repairs of Appleton second lock	do		208.48
Repairs of Appleton first lock house and warehouse.	Materials	161.86	
Do	Labor and transportation	51.00	212.86
Repairs of Menasha lock	Materials	722.14	
Do	Labor and transportation	207.03	929.17
Repairs of Eureka lock	Materials	81.17	
Do	Labor and transportation	31.27	112.44
Repairs of Berlin lock	Materials	11.42	
Do	Labor and transportation	18.29	29.71
Repairs of White River lock	Materials, labor, and transportation.		160.25
Repairs of Princeton lock	Materials	205.77	
Do	Labor and transportation	83.34	289.11
Repairs of Grand River lock house	Materials	271.72	
Do	Labor and transportation	46.90	318.62
Repairs of Montello lock and dam	Materials	100.94	
Do	Labor and transportation	314.88	415.82
Repairs of Governor Bend lock	do		42.86
Repairs of Fort Winnebago lock	do		39.00
Repairs of Portage lock	do		154.07

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Detailed statement of expenditures for fiscal year ending June 30, 1908—Con.

Character of works, etc.	Item of expense.	Amount.	Total.
Special repairs to plant	Barge Princeton	$435.35	
Do	Scow Eureka	79.00	
			$514.35
Dredging bars and channels	Fuel, supplies, etc	1,657.48	
Do	Labor and transportation	4,089.10	
			5,746.58
General repairs to plant, boats, dredges, machinery, etc.	Repairs of tug Wolf	820.95	
Do	Repairs of tug Fox	801.85	
Do	Repairs of dredge No. 5	200.25	
Do	Repairs of dredge No. 4	560.03	
Do	Repairs of quarter boat No. 1.	16.31	
Do	Repairs of flat scows Nos. 4 and 3.	243.04	
Do	Repairs of ponton scow No. 1.	19.13	
Do	Repairs of drill scow	11.54	
Do	Materials	180.43	
Do	Labor and transportation	35.97	
			2,889.50
General repairs to locks, dams, and canal banks	Materials	2,796.14	
Do	Labor and transportation	2,309.19	
			5,105.33
Care of works and property	Traveling expenses of assistant engineers, etc.	282.74	
Do	Fuel for tugs Fox and Wolf.	525.30	
Do	Watchmen, labor, and transportation.	2,562.89	
Do	Subsistence on inspection trips.	32.69	
Do	Lighting Kaukauna guard lock.	6.00	
Do	Mail boxes	12.36	
			3,421.98
Maintenance of navigation	Lock masters' services	7,954.42	
Do	Gauge observer's services	55.00	
			8,009.42
Superintendence and contingencies	Salary of assistant engineer.	2,200.00	
Do	Salary of junior engineer	1,650.00	
Do	Salary of superintendent	1,650.00	
Do	Salary of survey man	866.67	
Do	Salary of clerks, etc	2,199.56	
Do	Rent of office, Oshkosh	480.00	
Do	Rent of telephones and tolls.	250.21	
Do	Rent of post-office box, Oshkosh.	4.00	
Do	Mileage of officers	92.67	
Do	Telegrams	.81	
Do	Stationery	44.08	
Do	Miscellaneous	3.55	
			9,441.85
Total			45,171.78

K K 21.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

Wreck of steamer City of Glasgow, Green Bay Harbor, Wisconsin.—On December 3, 1907, the steamer *City of Glasgow* burned and sunk in the dredged channel about 1 mile inside of Tail Point light, completely blocking the channel.

As navigation was practically closed at the time of the wreck, proposals for removing it were solicited and a contract was entered into January 8, 1908, with Thomas H. Smith for removing the wreck

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for $919 and the vessel and contents. The wreck was entirely removed and the channel cleared on May 23, 1908. Final settlement with the contractor has not been made.

Wreck of schooner R. H. Becker in Sheboygan Harbor, Wisconsin.—On May 7, 1908, the schooner *R. H. Becker* capsized between the piers at Sheboygan Harbor, Wisconsin.

As the wreck formed a dangerous obstruction to navigation and had been abandoned by its owners, it was removed by the United States without the intervention of a contract, at a cost of $887.67.

The wreck now lies 1 mile north of the pierhead light, Sheboygan Harbor, Wisconsin, and 600 feet out from shore in 15 feet of water; it no longer forms an obstruction to navigation.

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APPENDIX L L.

IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST CHICAGO, ILLINOIS, DISTRICT.

REPORT OF COL. W. H. BIXBY, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Chicago Harbor, Illinois.
2. Chicago River, Illinois.
3. Calumet Harbor, Illinois.
4. Calumet River, Illinois and Indiana.
5. Michigan City Harbor, Indiana.
6. Removing sunken vessels or craft obstructing or endangering navigation.

UNITED STATES ENGINEER OFFICE,
Chicago, Ill., July 15, 1908.

SIR: I have the honor to forward herewith the annual reports upon the works in my charge for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

W. H. BIXBY,
Colonel, Corps of Engineers.

THE CHIEF OF ENGINEERS, U. S. ARMY.

L L 1.

IMPROVEMENT OF CHICAGO HARBOR, ILLINOIS.

For description of the outer basin and the improvements accomplished therein see Report of the Chief of Engineers, U. S. Army, for 1905, page 2065. For statement of projects see summary, page 670.

The contract with the Great Lakes Dredge and Dock Company, approved August 31, 1905, for dredging in the outer basin, was completed on July 10, 1907, 12,090 cubic yards of material being removed between the 1st and 10th of that month, making the total work under the contract 857,107 cubic yards, at 10½ cents per cubic yard. The dredged material was deposited back of the harbor line of Grant Park. The 21-foot depth area now extends over about 71¾ acres of the outer basin, in the shape of a strip about 1,200 feet wide from the lake wall of the basin westerly, and about 2,950 feet long from the river piers southwardly.

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Under a contract with the Jackson & Corbett Company, approved July 28, 1906, work on the concrete superstructure of the north pier was continued throughout the year, except while stopped by winter weather, from December to May.

The balance of the old superstructure over the north pier, about 708 feet, was removed, and the foundation for the new superstructure practically completed over 833 feet; 295 concrete blocks were made and 345 secured in place; about 3,419 cubic yards of No. 1 concrete and 557 cubic yards of No. 2 concrete were secured in the work; the concrete superstructure was completed for a distance of 815 feet; the pile protection along the south face of the pier partly completed for a distance of 758 feet; 6 clumps of piles were driven and completed, 3 at each end of the pier. This contract is about 89 per cent completed.

For reasons given in detail in last year's report, this pier superstructure work has progressed much more slowly than anticipated. The contract was extended February 15, 1907, for a reasonable period. It seems probable now that it may be completed in August, 1908.

The United States life-saving station and the United States Engineer Department boathouse are located near the north end of the easterly breakwater. A pier to protect them against strong southerly and southwesterly winds was found necessary to allow the safe launching and landing of boats. The matter was taken up with the Life-Saving Service which resulted in an agreement to build a protection pier of 300 feet length in the harbor basin near these buildings, one-half of the cost to be paid by the Life-Saving Service and one-half by the Engineer Department. Under date of April 24, 1908, an emergency contract was entered into with Great Lakes Dredge and Dock Company, of Chicago, Ill., for the construction of such a protection pier at an approximate cost of $5,000. Work was begun on June 20, and at the close of the year all of the piles had been driven but no other work was done. The contract is about 25 per cent completed.

A contract for about $20,000 of work (about 90,000 cubic yards) was entered into under date of May 28, 1908, with The Fitz Simons & Connell Company, of Chicago, Ill., for dredging the main entrance to the harbor up to Rush Street Bridge, a distance of about 0.87 mile, to a depth of 21 feet below Chicago city datum and to within 20 feet of the piers. This contract also covers dredging in the main branch of Chicago River. Work under this contract was begun June 16 and at the close of the year 15,327 cubic yards of material had been removed and the contract about 17 per cent completed.

The piers and breakwaters, except the north pier now being rebuilt in concrete, being constructed of wooden cribs ballasted with stone, their superstructures must, in course of time, be entirely rebuilt. The south pier is in reasonably fair condition, though some of the decking is torn off and some of the top side timbers and ties are broken. The easterly and southerly breakwaters are in bad condition and need extensive repairs; the superstructure and decking are considerably decayed and badly broken up in many places and should be replaced by concrete superstructure. The exterior breakwater is also decayed in scattered places, but might be repaired so as to last for several years.

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Under act of Congress of May 28, 1908, any or all of the available balance of Chicago Harbor is made available, in the discretion of the Secretary of War, for expenditure on the existing project for Chicago River. Dredging in the outer basin has been temporarily postponed, as work in the river is urgently demanded by navigation interests, and is therefore considered of more immediate importance than that in the basin. The amount thereby diverted will be needed later whenever the completion of original project becomes urgent.

Money statement.

July 1, 1907, balance unexpended		$340,859.59
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$14,779.17	
For maintenance of improvement	[a] 46,654.41	
		61,433.58
July 1, 1908, balance unexpended		279,426.01
July 1, 1908, amount covered by uncompleted contracts		42,686.57
Amount (estimated) required for completion of existing project		44,960.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$44,960.00	
For maintenance of improvement	10,000.00	
		54,960.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

July 11, 1870	$100,000.00	July 13, 1892	$72,000.00
March 3, 1871	100,000.00	August 18, 1894	80,000.00
June 10, 1872	90,000.00	March 3, 1899	100,000.00
March 3, 1873	90,000.00	March 3, 1905	200,000.00
June 23, 1874	75,000.00	March 2, 1907	250,000.00
March 3, 1875	78,000.00		
August 3, 1876	5,000.00	Total appropriated	2,360,000.00
June 18, 1878	75,000.00	Received from all sources since 1870 (transfer of tugs, sales, etc.)	936.46
March 3, 1879	75,000.00		
June 14, 1880	145,000.00	Total appropriated	2,360,936.46
March 3, 1881	150,000.00	Transferred to Chicago River from 1894 appropriation	25,000.00
August 2, 1882	200,000.00		
July 5, 1884	100,000.00		2,335,936.46
August 5, 1886	75,000.00		
August 11, 1888	200,000.00		
September 19, 1890	100,000.00		

CONTRACTS IN FORCE.

Name of contractor: Jackson & Corbett Company, Chicago, Ill.

Character of work: Removing and replacing superstructure, North Pier, by concrete superstructure, etc. Total, about $80,000.

Price per unit: For removing 1 crib, 50 by 30 by 19 feet, $2,500; replacing 1 new crib, 30 by 30 by 20½ feet, $5,500; removing other old superstructure and leveling other cribs, $4 per linear foot; white-oak timber, $55 per 1,000 feet, pine timber, $50 per 1,000 feet; white-oak piles, $16.65 each; Norway pine piles, $16.65 each; screw bolts, tie-rods, turn-buckles and anchor rods, 7 cents per pound; driftbolts, 4 cents per pound; T-rails, with bolts, 3½ cents per pound; channel irons, 3½ cents per pound;

[a] Maintenance (d 1).

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staples, 6 cents per pound; manhole covers, with frames, etc., $8 each; wrought-iron pipes, $1; wrought-iron gates, with frame, lock, etc., $150 each; wire rope, 20 cents per linear foot; riprap stone (new, if required), $5 per cord of 128 cubic feet; broken stone and gravel filling (floor of passageway), $2.25 per cubic yard; concrete blocks (No. 1 concrete), $7.10 per cubic yard; concrete in mass (No. 1 concrete), $7.50 per cubic yard; concrete in mass (No. 2 concrete), $5.25 per cubic yard.

Date of approval: July 28, 1906.

Date for beginning of work: August 30, 1906.

Date for expiration: February 28, 1907. (Extended February 15, 1907, for a reasonable time.)

Name of contractor: Great Lakes Dredge and Dock Company, Chicago, Ill.

Amount and character of work: Construction pile protection pier, about $5,000.

Price per unit: White-oak piles 35 feet long, $11 each; sheet piles 22 feet long, $55 per 1,000 feet board measure; Oregon fir timber (wales), $60 per 1,000 feet board measure; Oregon fir stringers 6 inches by 12 inches, $55 per 1,000 feet board measure; soft steel tie rods, 5½ cents per pound; screw bolts, 5 cents per pound; boat spikes, 4½ cents per pound; riprap stone, $7 per cord of 128 cubic feet; wire rope, 15 cents per linear foot; railroad spikes, 4½ cents per pound.

Date for beginning of work: May 4, 1908.

Date for expiration: Sixty good working days thereafter.

Name of contractor: The Fitz Simons & Connell Company, Chicago, Ill.

Amount and character of work: Dredging, about $20,000.

Price per unit: 22½ cents per cubic yard, measured in scows.

Date of approval: June 22, 1908.

Date for beginning of work: July 24, 1908.

Date for expiration: Two hundred good working days thereafter.

COMMERCIAL STATISTICS.

Actual receipts and shipments, by lake, at Chicago, Ill., during calendar year 1907, in tons of 2,000 pounds, except copper and iron ore, which are in gross tons.

Receipts.	Quantity.	Shipments.	Quantity.
	Tons.		*Tons.*
Coal	866,052	Corn	881,000
Lumber	753,994	Wheat	247,000
Salt	185,565	Flour	220,257
Iron ore	141,886	Mill stuffs	148,335
Sugar	108,107	Oats	35,220
Railroad ties	68,938	Oil cake	30,750
Cement	59,315	Oil	29,553
Green fruits	53,593	Rye	20,[illegible]
Poles	30,706	Grass seed	4,[illegible]
Posts	17,975	Wool and hair	4,565
Wood	11,367	Malt	673
Flax seed	9,826	Tallow	573
Shingles	4,944	Pork	495
Lath	546	Lard	388
Copper	100	Broom corn	253
Unclassified	694,070	Hides and leather	247
		Barley	13
		Unclassified	289,347
Total	3,007,074	Total	1,973,048

Comparison of actual receipts and shipments for years 1898 to 1907, inclusive.

Year.	Tons.	Year.	Tons.
1898	7,391,454	1903	6,105,855
1899	6,189,365	1904	4,446,671
1900	5,873,070	1905	5,288,896
1901	6,184,242	1906	5,011,736
1902	5,184,792	1907	4,980,128

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L L 2.

IMPROVEMENT OF CHICAGO RIVER, ILLINOIS.

For general description of original condition of river, its projects, and general results, see summary, page 672.

Contracts were entered into during the year as follows:

1. With Great Lakes Dredge and Dock Company, Chicago, Ill., May 22, 1908, for the construction of about 480 feet of dock along the west boundary of the South Branch turning basin at South Ashland avenue (about 5.6 miles from the mouth of the river), at an estimated cost of $10,374.90.

2. With The Fitz Simons & Connell Company, Chicago, Ill., May 28, 1908, for dredging in Main River from Rush Street Bridge west to the junction of the North and South branches, a distance of about 0.71 mile, to a depth of 21 feet below low water (the same below Chicago city datum), and to within 20 feet of existing docks and piers and to within 10 feet of bridge pier protections, at an estimated cost of $40,000 (about 180,000 cubic yards).

3. With Great Lakes Dredge and Dock Company, Chicago, Ill., May 28, 1908, for dredging in the North Branch and North Branch Canal, and for dredging, rock excavation, and removal of hardpan in the South Fork of the South Branch. The dredging in the North Branch is to extend from the Chicago and Northwestern Railway bridge up about three-fourths mile to the south end of Goose Island; thence for about 1¼ miles farther to the North Branch turning basin (about 3.7 miles from mouth of river); also in the North Branch Canal east of Goose Island for about 1 mile length; and the dredging, rock excavation, etc., in the South Fork of the South Branch is to extend from the south turning basin at Fuller street up to the railroad bridges near the stock yards. In all cases the dredging and excavation is to be carried to 21 feet depth below low water and to as great width as practicable, but stopping at 20 feet distance from docks and 10 feet distance from bridge piers and abutments, this limit in width being due to the poor condition of docks, the fluidity of soil, and the limitations of the approved project. The estimated cost of the work under this contract is $227,000.

Under contract No. 1 work was commenced June 19 and 120 piles were secured in place, but no other work was done.

Under contract No. 2 work was commenced at Rush Street Bridge June 26 and 3,075 cubic yards of material was removed.

Under contract No. 3 work was commenced June 10 in the South Fork of the South Branch and 21,378 cubic yards of material was removed, and on June 15 in the North Branch Canal, where 29,827 cubic yards of material was removed. The work thus far done under this contract has resulted in improving the channel in the South Fork for a distance of about 900 feet and in the North Branch Canal for a distance of about 1,200 feet.

Soundings were taken and platted in the main river, North Branch, North Branch Canal, and South Fork of South Branch to ascertain the amount of dredging and rock excavation required. Upon complaints received from the navigation interests special soundings were made from time to time at various bridge crossings where the channel had shoaled sufficiently to interfere with the safe passage of vessels,

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and the worst shoals, at Indiana street on the North Branch, at the Metropolitan Elevated Railroad bridge and at Washington street on the South Branch, were removed.

By outside parties, but under War Department permits or orders, involving supervision by this office, special work has progressed as follows:

Tunnels under Chicago River.—For the history of this matter reference is had to the Annual Report of the Chief of Engineers for 1905, pages 2069, 2073 to 2109, inclusive; Annual Report, 1906, pages 1774–1775, and to the present summary, page 673.

At La Salle street.—The original order of the Secretary of War, dated September 27, 1904, required a depth of water over the tunnel of at least 22 feet for a width of at least 160 feet near the middle of the river. The full width required by such order, and a great deal more, has now been given. As the Sanitary District water-flow requirements made necessary a future depth of 26 feet at low water, the traction company not only removed the top of the tunnel to 28 feet depth over 200 feet center width of river, but also dredged away the river bottom to 28 feet depth for a width of 30 feet along each side of the old tunnel site, completing such work on April 8, 1907. At the ends of this 200 feet clear channel width the old tunnel and the river bed have been dredged away in such shape as to afford about 28 feet depth at 40 feet or less from the dock lines, rising gradually to about 10 feet or more at distances of 15 feet or less from the dock lines, the remaining portion of the river bed close to the dock lines having, as heretofore, a depth of about 10 or 11 feet.

At Washington street.—The War Department order quoted above required a depth of water over this tunnel of at least 22 feet for the entire width of the river between abutments of the proposed new bridge to cross the river at this street. The old bridge was removed by the traction company; but as the details of the new bridge to be built by the city of Chicago have not yet been determined upon the exact location of the new abutments was not known when the work of the tunnel lowering commenced, and is still unsettled. The top of the new tunnel was so located that it all has more than 22 feet depth of water over it for the entire present 150 feet width of river, and will have the same depth of water over it for 200 feet width of river whenever the widening shall be done by the Sanitary District of Chicago under the permission granted it July 11, 1900. As the present 150 feet width of river is greater than that which will probably exist after the new bridge is built, it was considered that the traction company complied with the order of the War Department by confining its work within the limits of 150 feet present width. Such work was completed early in October, 1907, and examinations made by this office at that time showed at least 22 feet depth everywhere over the new tunnel roof and 27 feet depth over the west 100 feet width of river, these depths extending up and down stream over a distance of a few feet greater than the original width of the tunnel.

At Van Buren street.—The War Department order quoted above required a depth of water over this tunnel of at least 22 feet for a a width of 160 feet near the middle of the river. As the Sanitary District water-flow requirements made necessary a future greater depth at low water, the traction company dredged to 27 feet below Chicago city datum in the center of the river over the top of the tunnel,

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and to lesser depths over a total width of 162 feet, going with 21 feet depth to within about 5 feet of the east dock and going with 23 feet depth to within about 17 feet of the west dock. Dredging was not considered safe nearer the east dock because of the existence of large heavy buildings close to the dock; nor was it considered practicable nearer to the west dock because of a cofferdam left by the Sanitary District of Chicago to protect the east wall of its water by-pass, such wall being founded at only about 16 feet depth below the water surface. The work was completed in March, 1908.

During the year the Sanitary District of Chicago continued the work of securing a channel of 26 feet mid-river depth and 200 feet width through the South Branch of Chicago River from its mouth to the drainage canal entrance, and began the excavation of the North Shore Canal connecting Lake Michigan and the North Branch of Chicago River. The work of this Sanitary District for the year is briefly as follows: South Branch, Chicago River, widened to 200 feet between Madison and Adams streets, also from the Seipp property south of Van Buren street for a distance of 150 feet to the Union Elevated Railroad Company's power house, and also between Sixteenth and Eighteenth streets; commenced the widening between Maxwell street and the Armour elevator near Sixteenth street; completed Dearborn Street Bridge; prepared plans for a new bascule bridge at Twelfth street; prepared for letting of contracts to make movable the bridges on the main canal; commenced September 25, 1907, excavation of the North Shore Canal (estimated to cost $2,500,000) near the lake shore in Wilmette, and to June 30, 1908, actually excavated about 100,000 cubic yards of material, and built about 500 feet of crib pile at the lake entrance to this canal.

Complaints by vessel men of unreasonable delays at some of the bridges across the river have continued, as in former years. The action taken in each case has brought temporary relief, but not permanent correction of the abuse. Regulations to govern the operation of the Chicago River bridges were submitted for the approval of the Secretary of War August 9, 1906.

The present condition of the river is as follows:

The channel in the Main Branch from the lake to Clark Street Bridge has a depth of not less than 21 feet below Chicago city datum; thence to the respective mouths of the North and South branches from 19 to 20 feet (this part is at present being further deepened to 21 feet under new contracts). The South Branch and the part of the West Fork to Robey street form part of the Sanitary District Canal, and are to be maintained to 26 feet depth by the district. There are, however, places in this branch where for part width of the channel the depth does not exceed 19 feet, as near the Lake Street Bridge; above and below the site of the now removed Washington street tunnel; at a place south of Jackson boulevard, and above and below the site of the now removed Van Buren street tunnel; but these are to be dredged by the Sanitary District during the next few months.

The South Fork of the South Branch is now being deepened to 23 feet below Chicago city datum (or about 21 feet below hydraulic grade of the river) including the removal of rock and hardpan found in this section of the river. This depth has already been practically obtained from the Archer Avenue Bridge near the fork mouth up to the Wabash elevator. Between the fork mouth and Archer Avenue Bridge, and from the Wabash elevator southwardly to the stock yards, there is already generally 19 to 20 feet depth, but with scattered shoal spots of only 17 and 18 feet depth.

The North Branch between the Chicago, Milwaukee and St. Paul Railway bridge and the North turning basin, has a mid-channel depth of 17 feet; thence to Fullerton avenue about 12 feet, and to Belmont avenue about 10 feet. This part of the river is now being deepened, under contract, to 21 feet below Chicago city datum and low water. In the North Branch Canal east of Goose Island the channel depths average

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from 16 to 21 feet; but the upper portion for about 2,000 feet has now been deepened everywhere to 21 feet under the existing contract, and the lower half of the canal will be similarly dredged by August, 1908.

Bridges were authorized by the Secretary of War during the year: At Franklin-Orleans streets, highway, bascule; at South Ashland avenue, highway, temporary; at Kinzie street, highway, temporary; at Erie street, highway, bascule; at Polk street, highway, bascule; at Belmont avenue, highway, temporary footbridge. Bridges were completed by their owners: At North avenue, highway, bascule; at Dearborn street, highway, bascule. Bridges were removed by their owners: At North avenue, highway, temporary; at Belmont avenue, highway, temporary footbridge.

Money statement.

July 1, 1907, balance unexpended		$349,095.09
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$3,204.94	
For maintenance of improvement	4,042.57	
		7,247.51
July 1, 1908, balance unexpended		341,847.58
July 1, 1908, amount covered by uncompleted contracts		277,374.90
Amount (estimated) required for completion of existing project		510,600.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908		300,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

Allotment from act of August 18, 1894, for Chicago Harbor	$25,000.00
Act of June 3, 1896	50,000.00
Sundry civil act, June 4, 1897	113,000.00
Sundry civil act, July 1, 1898	460,000.00
Sundry civil act, June 6, 1900	62,000.00
Act of June 13, 1902	306,457.00
Received from sale of earth and old buildings	1,721.12
Act of March 2, 1907	300,000.00
Total	1,258,178.12

CONTRACTS IN FORCE.

Name of contractor: Great Lakes Dredge and Dock Company, Chicago, Ill.

Amount and character of work: Dock construction, estimated to cost at contract prices, $10,374.90.

Price per unit: White or burr oak piles 35 feet long, $10.50 each; hard-wood piles 20 feet long, $5 each; hard-wood piles 16 feet long, $4.50 each; sheet piling 28 feet long, $50 per 1,000 feet board measure; Oregon fir timber (wales), $55 per 1,000 feet board measure; Oregon fir stringers, $50 per 1,000 feet board measure; hemlock timber (back logs), 30 cents per linear foot; pine timber No. 1 common, $40 per 1,000 feet board measure; soft steel anchor rods, 4½ cents per pound; screw bolts, 5 cents per pound; steel drift bolts, 4 cents per pound; wire nails, 4 cents per pound; 90-pound iron rails, 2¾ cents per pound; railroad spikes, 4 cents per pound.

Date of approval: June 2, 1908.

Date for beginning of work: June 24, 1908.

Date for expiration: 50 good working days thereafter.

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Name of contractor: The Fitz Simons & Connell Company, Chicago, Ill.
Amount and character of work: Dredging, about $40,000.
Price per unit: 22½ cents per cubic yard, measured in scows.
Date of approval: June 22, 1908.
Date for beginning of work: July 24, 1908.
Date for expiration: 200 good working days thereafter.

Name of contractor: Great Lakes Dredge and Dock Company, Chicago, Ill.
Amount and character of work: Dredging and rock excavation, about $227,000.
Price per unit: Dredging in North Branch and canal, 17½ cents per cubic yard, measured in scows; dredging in South Fork, South Branch, 29 cents per cubic yard, measured in scows; removing nondredgeable hardpan in South Fork South Branch, $2.40 per cubic yard, place measurement; for rock excavation in South Fork, South Branch, $4.80 per cubic yard, place measurement.
Date of approval: June 11, 1908.
Date for beginning of work: July 13, 1908.
Date for expiration: In North Branch and Canal, within 180 good working days thereafter, and in South Fork, South Branch, within 200 good working days thereafter.

COMMERCIAL STATISTICS.

The commerce of this river has been reported under the head of Chicago Harbor, of which it is naturally a part.

L L 3.

IMPROVEMENT OF CALUMET HARBOR, ILLINOIS.

For general description of original condition of this harbor, its projects, and general results, see Summary, page 674.

All original project work was completed in 1905, leaving only its maintenance.

Considerable damage was done to the breakwater by the severe storms of the past winter and spring. At a point about 3,000 feet from the shore the superstructure was practically destroyed down to the water level over a distance of about 50 feet, and at a point about 150 feet farther east a similar break occurred over a distance of about 64 feet. Damage of a less serious character was also done at various other places along this breakwater and its extension. To repair these damages, an emergency contract was entered into June 6, 1908, with Cullen-Friestedt Company, Chicago, Ill., at an estimated cost of $16,612.50. Work was commenced on June 12, the work of June consisting in the removal of a number of the old broken timbers and decking. Work is still in progress.

The automatic water gauge has been in operation during the year, tables of daily and monthly means were constructed and, together with the original record, were sent to the Lake Survey office at Detroit, Mich., as heretofore. The specially unusual fluctuations observed (all referred to Chicago city datum) were as follows:

Between 12 midnight July 3 and 1 a. m. July 4, 1907, the lake rose 1.6 feet, and from 11 p. m. July 4 to midnight same day it rose 0.9 foot more, going down within the next hour 1.2 feet to about the average level of the day. On June 21, 1908, the lake had a rise of 1.6 feet between 12 noon and 3.40 p. m., dropping back 1 foot by 4 p. m. same day. Highest water of the year, +2.53 feet May 29, 1908, 5.55 p. m.; lowest water of the year, —0.66 foot January 1, 1908, 9.30 p. m.

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The superstructure over the westerly 900 feet of the north pier is in a dilapidated condition and will require repairs in the near future. The south pier is in good condition, but the revetment west of the Calumet and Chicago Canal and Dock Company's slip is in need of repairs. There is, however, no work urgently necessary except what is already in progress. The channel to and between the harbor piers has generally a full depth of 21 feet below Chicago city datum.

Soundings were last taken over the Calumet bar, off the entrance to the harbor, in July, 1906, and a new survey over the bar (under existing funds) will probably be desirable this year.

Some slight injuries to the north pier of the river entrance, made by passing steamers, were repaired during the year by and at the expense of the boat owners or agents.

It is proposed to expend the balance available for repairs and other maintenance under subproject approved March 23, 1907.

Money statement.

July 1, 1907, balance unexpended	$113,346.46
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	2,838.09
July 1, 1908, balance unexpended	110,508.37
July 1, 1908, amount covered by uncompleted contracts	16,612.50

APPROPRIATIONS.

July 11, 1870	$50,000.00	August 18, 1894	$15,000.00
March 3, 1871	50,000.00	June 3, 1896	75,000.00
June 10, 1872	40,000.00	March 3, 1899	150,000.00
March 3, 1873	40,000.00	June 6, 1900	185,350.00
June 23, 1874	25,000.00	March 3, 1901	255,000.00
March 3, 1875	25,000.00	Sundry civil act of June 28, 1902	215,000.00
August 3, 1876	20,000.00	Sundry civil act of March 3, 1903	204,480.00
June 18, 1878	15,000.00	March 2, 1907	20,000.00
March 3, 1879	12,000.00	Total	1,567,230.00
June 14, 1880	20,000.00	Amount received from sale of property	1.00
March 3, 1881	30,000.00	Total	1,567,231.00
August 2, 1882	35,000.00		
July 5, 1884	20,000.00		
August 5, 1886	10,000.00		
August 11, 1888	20,400.00		
September 19, 1890	20,000.00		
July 13, 1892	15,000.00		

CONTRACT IN FORCE.

Name of contractor: Cullen-Friestedt Company, Chicago, Ill.

Amount and character of work: Repairs to breakwater, estimated to cost at contract prices, $16,612.50.

Price per unit: Yellow pine timber, $43 per thousand feet board measure; yellow pine decking and decking supports, $40 per thousand feet board measure; frame and secure blocks taken from old work, $20 per thousand feet board measure; steel drift bolts, 4 cents per pound; wrought-iron spikes, 4 cents per pound; riprap stone, $9.75 per cord of 128 cubic feet.

Date for beginning of work: June 13, 1908.

Date for expiration: Seventy good working days thereafter.

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COMMERCIAL STATISTICS.

Actual receipts and shipments by lake at South Chicago, Ill., during calendar year 1907, in tons of 2,000 pounds, except copper and iron ore, which are in gross tons.

Receipts.	Quantity.	Shipments.	Quantity.
	Tons.		*Tons.*
Iron ore	4,717,426	Corn	469,965
Coal	642,440	Wheat	180,557
Lumber	65,372	Flour	79,402
Poles	39,282	Oats	35,843
Salt	35,036	Mill stuffs	27,479
Wheat	16,920	Oil	21,590
Posts	13,831	Oil cake	2,304
Railroad ties	7,901	Wool and hair	1,087
Flaxseed	6,440	Grass seed	459
Wood	4,678	Tallow	431
Copper	2,488	Hides and leather	129
Shingles	1,824	Pork	129
Lath	258	Unclassified	53,292
Green fruits	71		
Unclassified	3,713		
Total	5,557,680	Total	872,667

Comparison of actual receipts and shipments for years 1898 to 1907, inclusive.

Year.	Tons.	Year.	Tons.
1898	4,117,526	1903	4,742,225
1899	3,229,874	1904	3,728,260
1900	3,783,674	1905	4,530,394
1901	3,995,277	1906	5,290,826
1902	4,454,428	1907	6,430,347

L L 4.

IMPROVEMENT OF CALUMET RIVER, ILLINOIS AND INDIANA.

For general description of original condition of this river, its projects, and general results, see Summary, page 675.

Work was continued under the contract of June 1, 1905, with Great Lakes Dredge and Dock Company, for removal of the rock section between One hundred and eleventh and One hundred and fourteenth streets to a depth of 21 feet below Chicago city datum and for the full width of 200 feet between channel lines. This work during the year consisted in the removal of 21,882 cubic yards of rock and 25,063 cubic yards of soft material. The work under this contract was completed in January, 1908, at a total cost to the United States of $150,567.30. In all, since commencement of the work, 58,801 cubic yards of earth and 61,692 cubic yards of rock were removed, resulting in a channel of full depth of 21 feet and full width of 200 feet over a distance of 1,600 feet, between One hundred and eleventh and One hundred and sixteenth streets. The depth was verified by inspection with submerged sweeps.

Work was continued under the contract of April 4, 1907, with Great Lakes Dredge and Dock Company, of Chicago, Ill., for dredging the channel to a width of 180 feet at the bottom and to a depth of 21 feet from the rock section near One hundred and fourteenth street up to One hundred and twenty-second street (about 5,000 feet), and of 17 feet depth from One hundred and twenty-second street up to

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about One hundred and twenty-fourth street (about 2,000 feet) with a bottom width of 180 feet. The work under this contract was all paid for during the fiscal year and was completed in June, 1908. In all, 445,621 cubic yards of material was removed, at a total cost to the United States of $82,472.62, and has resulted in an improved channel for depths and widths above specified over a distance of 7,012 feet.

Under date of May 21, 1908, a contract was entered into with Great Lakes Dredge and Dock Company, of Chicago, for dredging from about One hundred and twenty-fourth street to a depth of 17 feet and bottom width of 200 feet up to the "Forks," near the mouth of Lake Calumet, a distance of about 1 mile. Work under this contract was commenced June 22 and good progress has been made up to the close of the year (although not enough to require any payments).

In June, 1908, a deed was tendered to the United States for the island in the Calumet River near Ninety-third street (about 1 mile from the river mouth), which is to be dredged out for use as turning basin No. 1. It is proposed to commence such dredging as soon as the deed is approved by the Department of Justice. No other deeds for land at the sites of the four remaining turning basins proposed in this river between the "Forks" and Ninety-third street have as yet been received.

Soundings were made and platted at various localities along the river during the year to ascertain the amount of dredging required.

Complaints by vessel men of delays at some of the bridges across the river above the "Forks" (where boat travel is slight) have continued, as in former years. The action taken in each case has brought temporary relief, but no permanent correction of the abuse.

In April, 1908, a petition was presented by the navigation interests of this river asking for the straightening of the three railroad bridges near One hundred and sixth street, which now cross the river at an angle making it difficult for large vessels to pass safely. The matter was taken up with the engineers of the three railroads interested, who have been studying the situation with a view to combined action so far as practicable, and it is hoped that a reasonably satisfactory solution of the question will be found before the end of the present year.

The following bridge was authorized and completed during the year: Chicago, Indiana and Southern Railroad trestle bridge, over the Grand Calumet River near Gary, Ind.

An application of the Sanitary District of Chicago for permission to reverse the flow of Calumet River, so as to cause the water to flow from Lake Michigan into the drainage canal (in a similar manner as has been done in the Chicago River), was denied by the War Department March 14, 1907, and later by temporary injunction of Federal courts, and the case is now being argued. A final decision by the United States Supreme Court will probably not be reached this season.

Upper Calumet River.—On the upper river "above the Forks" the work of the year, as well as that since 1885, is shown by the following extract from reports of Assistant Engineer G. A. M. Liljencrantz:

The river and harbor act approved June 13, 1902, provided that—

"The Secretary of War is hereby authorized to accept, in his discretion, deeds from the proper parties conveying to the United States, free from expense, such lands as

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may be necessary to make a proper channel two hundred feet in width from the forks of said river up to a point one-half mile above Hammond, in Indiana, and releasing to the satisfaction of the Secretary of War the United States from all liability for damages to adjacent property owners."

In 1904 the property owners indicated a disposition to take up the matter of conveying to the United States the right of way in accordance with the channel lines proposed and laid down on the map showing the survey of 1885. A blueprint of this map was furnished to Mr. Carter (president Calumet and Chicago Canal and Dock Company), and in a letter dated February 20, 1904, Mr. Carter says: "We will proceed in our endeavor to tender to the United States the lands included in the dock lines proposed for the Calumet River, from the Forks to a point one-half mile east of Hammond." Nothing, so far as this office is aware, was done or at least accomplished at that time.

In the summer of 1906 the matter was again taken up. As twenty-two years had elapsed since the previous survey of this part of the river (made in January, 1885), it was deemed necessary to make a new survey to determine whether the current in the river, which is frequently quite strong between the Forks and the junction, especially during freshets, had altered the river banks, necessitating a modification of the channel lines proposed in 1885.

Authority was therefore requested and obtained from the Chief of Engineers to use as much of the yet unexpended balance of the appropriation for work "above the Forks" as would be necessary for use in making the survey.

The expenditure of the sum of $800 was authorized and the survey made, the field work being in charge of Mr. A. T. Grohmann, junior engineer.

Work in the field was begun on May 20, 1907, and was completed on June 13, 1907. The field notes were platted and * * * a tracing was made of the map and blueprints taken, on which proposed channel lines were laid down; copies of these were furnished to a representative of the property owners. * * * Owing in part to the serious illness of Mr. Leslie Carter and in part to the fact that some of the land owners live in Europe, there was a great deal of further delay in the decision on the channel lines, and no progress has as yet been reported to this office. * * *

The principal changes since the previous survey of 1885 were:

1. *Improvements.*—The part of the river in question has been deepened, generally to a depth of 10 feet and width of 60 to 70 feet along the deepest part of the channel, as follows: In 1887 to 1889, dredging was done between the junction of the two river branches and the Michigan Central Railroad bridge, in stretches where most needed. West of the said bridge, the channel was dredged for a width of 200 feet and a length of 500 feet and to the same depth as the rest, to form a turning basin. In 1893 to 1894, dredging was again done, partly near the Forks and partly from the Junction up to Burnham, to same depth and width as before, but, before the contract had been completed, it was canceled, at the request of the contractors, on account of the rapid filling up of the dredged area with refuse from slaughterhouses, glue factories, etc. All the material removed from this part of the river was thrown up on adjacent banks. No work has been done here since.

2. *New bridges.*—The following new bridges have been built since 1885: Kensington and Eastern Railroad bridge (under construction); Rand avenue highway bridge; Chicago Terminal Transfer Railroad bridge; Chicago, Hammond and Western Railroad bridge (1906); New York, Chicago and St. Louis and Chicago and Erie Railroad bridge; Michigan Central Railroad bridge (at Hammond, 1903); Calumet avenue highway bridge.

3. *New industries.*—The following new enterprises have been established since 1885: The Ryan Car Company, at Hegewisch; The Western Steel Car and Foundry Company, supplanting the United States Car Construction Company, in existence in 1885; The American Glue Company at West Hammond; The Stein and Hirsch Glue Company; enlargement of the Hammond Packing Company—later moved to Chicago; The American Steel Foundries, at Hammond, Ind.

The act of March 2, 1907, provided that contracts could be entered into for material and work under the 1903 project to an extent not exceeding $170,000 in excess of funds in hand, which sum, it is expected, will complete the improvement under the existing project. The sundry civil act of May 27, 1908, appropriated $140,000 of this amount, which will be expended, together with funds now available, upon deepening the channel for 16-foot draft from about One hundred and twenty-fourth street up to the "Forks" (now under con-

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tract), and to dredge out five proposed turning basins as fast as lands are tendered therefor, all in accordance with existing approved projects and provisions of the appropriations.

Money statement.

July 1, 1907, balance unexpended	$407,917.30
Amount appropriated by sundry civil act approved May 27, 1908	140,000.00
	547,917.30
June 30, 1908, amount expended during fiscal year for works of improvement	190,061.84
July 1, 1908, balance unexpended	[a] 357,855.46
July 1, 1908, amount covered by uncompleted contracts	108,000.00
Amount (estimated) required for completion of existing project	30,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	30,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATIONS.

July 5, 1884	$50,000.00	April 28, 1904 (allotted May 31, 1904)	[b] $41,718.98
August 5, 1886	30,000.00	March 3, 1905	100,000.00
August 11, 1888	50,000.00	June 30, 1906	156,000.00
September 19, 1890	50,000.00	March 2, 1907	191,500.00
July 13, 1892	75,000.00	March 4, 1907 (s. c.)	20,000.00
August 18, 1894	45,000.00	May 27, 1908 (s. c.)	140,000.00
June 3, 1896	50,000.00		
March 3, 1899	60,000.00		
June 13, 1902	75,000.00	Total	1,134,218.98

CONTRACT IN FORCE.

Name of contractor: Great Lakes Dredge and Dock Company, Chicago, Ill.

Amount and character of work: Dredging, about $108,000.

Price per unit: 22.9 cents per cubic yard, place measurement, to 17 feet depth; 11.45 cents per cubic yard, place measurement, at depths over 17 feet but not exceeding 19 feet.

Date of approval: June 2, 1908.

Date for beginning of work: June 19, 1908, or within fifteen days after termination of present dredging contract which this will follow.

Date for expiration: 200 good working days thereafter.

The commerce of this river has been reported under the head of Calumet Harbor, of which it is naturally a part.

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[a] Includes $5,130.75 for "Above the Forks."

[b] Omitting $1,281.02 returned to the Treasury.

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L L 5.

IMPROVEMENT OF MICHIGAN CITY HARBOR, INDIANA.

For general description of original condition of this harbor, its projects, and general results, see Summary, page 678; and a full description of this harbor in its condition in 1908 is to be found on pages 168–172, Bulletin No. 18, issued by United States Lake Survey Office, Detroit, Mich.

Outer harbor.—All work of the last project (1897) was completed in 1905 except a 200-foot length of the southwest end of the detached breakwater, estimated to cost $30,000, and for which funds were appropriated by the act of March 2, 1907.

Inner harbor.—All work of the last definite project (1882) was completed several years ago except about 1,000-foot length of the upstream end of the river next the Lake Erie and Western (formerly I. P. C.), Railroad bridge; this work having been postponed because the proper maintenance of the rest of the river and harbor required the use of all available funds. This uncompleted work is now estimated at about 64,000 cubic yards of dredging, to cost about $16,000.

Both harbors.—Work under the contract of April, 1907, with Greiling Brothers, of Green Bay, Wis. (begun June 28, 1907), was completed in July, 1907, and consisted in the removal of 9,088 cubic yards of material from the channel of the inner harbor and the old guard pier of the Franklin Street Bridge, at a total cost of $1, 953.92, whereby the channel between the piers was improved for a distance of about 755 feet.

In July, 1907, all work at this harbor was stopped upon instructions from the Secretary of War until further action by Congress upon the plan of improvement.

By public resolution No. 23, approved May 13, 1908, Congress authorized the use of any unexpended balance of money heretofore appropriated or that may be hereafter appropriated for the improvement or maintenance of the harbor, for the rebuilding of the western revetment upon a new alignment, with a view to widening the channel and harbor. A project covering such work will be submitted early in the coming fiscal year. Negotiations are already under way with officials of the city of Michigan City, Ind., for deeding the necessary land to the United States free of cost, such deeds having been promised.

In April, 1908, a detailed examination was made of the piers and breakwater and an estimate was prepared covering the cost of emergency repairs absolutely necessary to carry the structures safely through the navigation season of 1908. Authority for such work was received from the Engineer Department and an emergency contract covering the necessary repairs was entered into under date of May 26, 1908, with Great Lakes Dredge and Dock Company, of Chicago, Ill., at an estimated cost of $4,885.50. Work under this contract was begun on June 22 and at the close of the year was about 20 per cent completed. It is expected to complete all the work under the contract in July.

An examination made in May, 1908, showed that the channel between the piers had shoaled up so badly that the usual annual

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work of dredging must be done immediately in order to accommodate the navigation desiring to use the harbor. Accordingly, authority was obtained to expend not to exceed $5,000 for emergency dredging in the main harbor entrance between the existing piers to the project depth. This work was commenced on June 4 by a hired dredge supplemented later by the U. S. dredge *General Gillespie*. The work was finished on June 16 and a total of 17,027 cubic yards of material was removed, which resulted in a good channel of at least 15 feet depth at low water (18 feet in middle of channel) from the harbor entrance to Franklin Street Bridge.

Condition of work.—The present condition of the work is practically the same as described on page 1793, Annual Report, 1906, except that about $1,000 more than there named, will be spent in replacing stone washed out of the outer breakwater and inner piers during the past year. The southwest entrance pier is not liable to last more than one or two years longer without extensive repairs, and then it will be far more advantageous to Michigan City commerce and general navigation if this pier be entirely rebuilt at its inshore end in a location about 125 feet farther toward the southwest, so as to place it in prolongation of the outer half of the pier (newest half) and make the two entrance piers parallel to each other, and then removing the old half pier and dredging the river entrance to its full uniform width of about 225 feet. Such work has now been practically authorized by the act of May 13, 1908, above referred to. The cost of such work is now estimated at $72,000; the increase over the $61,000 estimate of last year's reports being largely due to higher rates for materials and labor.

Owing to deposits due to freshets from the upper river, from leakage of sand through the entrance piers and to drift from the lake during storms, a large amount of redredging is necessary in the river to allow of a good 15-foot draft at lowest water. Such redredging is now estimated at 200,000 cubic yards, and to cost about $50,000.

The work now in sight in this harbor yet to be done is, therefore, now estimated as follows (arranged in order of precedence):

Widening of inner harbor entrance	$72,000
Repair of piers and breakwater	3,000
Superintendence and contingencies	9,000
Redredging of river channel depth	50,000
Completion of 1882 project (dredging)	16,000
Completion of 1897 project (breakwater)	30,000
	180,000

As there is now unpledged about $75,000, there is needed about $105,000 more to complete work and bring the maintenance up to date. Of this amount, the $30,000 for breakwater extension is not urgently needed; and the extension may never be found necessary. An additional $10,000 should be provided yearly for future maintenance of channel, piers, breakwater, etc.

It is proposed to expend the present available funds upon the completion of the projects of 1882 for the river and 1897 for the lake front, and upon their maintenance and upon the widening of the harbor entrance authorized by the 1908 resolution, following the order of work named above.

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Money statement.

July 1, 1907, balance unexpended	$84,983.27
June 30, 1908, amount expended during fiscal year for maintenance of improvement	5,518.76
July 1, 1908, balance unexpended	79,464.51
July 1, 1908, outstanding liabilities	159.73
July 1, 1908, balance available	79,304.78
July 1, 1908, amount covered by uncompleted contracts	4,885.50
Amount (estimated) required for completion of existing project	75,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$16,000.00
For maintenance of improvement	59,000.00
	75,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Date.	Outer harbor.	Inner harbor.	Total.
July 4, 1836			$20,000.00
March 3, 1837			30,000.00
July 7, 1838			60,733.59
June 11, 1844			25,000.00
August 30, 1852 a			20,000.00
March 2, 1855 (claim of J. R. Bowes)			470.33
June 23, 1866			75,000.00
July 25, 1868 (allotment)			25,000.00
April 10, 1869 (allotment)			31,185.00
July 11, 1870	$25,000.00		25,000.00
March 3, 1871	15,000.00		15,000.00
June 10, 1872	50,000.00		50,000.00
March 3, 1873	50,000.00		50,000.00
June 23, 1874	50,000.00		50,000.00
March 3, 1875	50,000.00		50,000.00
August 14, 1876	35,000.00		35,000.00
June 18, 1878	50,000.00	$25,000.00	75,000.00
1878 (allotment)	2,500.00		2,500.00
March 3, 1879	40,000.00		40,000.00
June 14, 1880	40,000.00	15,000.00	55,000.00
March 3, 1881	20,000.00	25,000.00	45,000.00
August 2, 1882	60,000.00	20,000.00	80,000.00
July 5, 1884	40,000.00	10,000.00	50,000.00
August 5, 1886	54,375.00	1,875.00	56,250.00
August 11, 1888	90,000.00	5,000.00	95,000.00
September 19, 1890	50,000.00	7,500.00	57,500.00
July 13, 1892	30,000.00	15,000.00	45,000.00
August 18, 1894	20,000.00	10,000.00	30,000.00
June 3, 1896	70,000.00	10,000.00	80,000.00
March 3, 1899		7,500.00	7,500.00
June 6, 1900	195,000.00		195,000.00
June 13, 1902			63,000.00
March 3, 1905			45,000.00
March 2, 1907			60,000.00
Miscellaneous receipts			4,130.00
Total	1,036,875.00	151,875.00	1,648,268.92

a Amount carried to surplus fund, $5.15.

CONTRACT IN FORCE.

Name of contractor: Great Lakes Dredge and Dock Company, Chicago, Ill.

Amount and character of work: Repairs to piers, about $4,900.

Price per unit: Yellow pine timber, $80 per thousand feet board measure; iron or steel screw bolts, 6 cents per pound; rubblestone, $11.30 per cord of 128 cubic feet.

Date for beginning of work: June 6, 1908.

Date for expiration: Sixty good working days after date of notification, May 27, 1908.

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COMMERCIAL STATISTICS.

Actual receipts and shipments by lake at Michigan City, Ind., during calendar year 1907, in tons of 2,000 pounds.

Receipts.	Quantity.	Shipments.	Quantity.
	Tons.		*Tons.*
Lumber	46,066	Merchandise	152
Salt	11,285		
Railroad ties	5,225		
Wood pulp	1,838		
Merchandise	1,206		
Shingles	200		
Fuel wood	75		
Posts	50		
Lath	30		
Total	65,975	Total	152

Registered tonnage of vessels entered	368,396
Registered tonnage of vessels cleared	368,668
Total freight carried in 1905	91,910
Total freight carried in 1906	89,170
Total freight carried in 1907	66,125

L L 6.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

(*a*) *Canal boat Pallas, in North Branch of Chicago River, near Kinzie street.*—The wreck of this vessel was reported as an obstruction to navigation by vessel owners. The wreck having been formally abandoned by the owner, it was raised, found worthless, and was then sunk in deep water in Lake Michigan in such way as to no longer interfere with navigation, at a total cost to the United States of $317.18.

(*b*) *Steam barge Atlas, in Main Branch of Chicago River, near Clark street.*—The wreck of this vessel was reported as an obstruction to navigation by the department of public works of the city of Chicago. The wreck having been formally abandoned, it was destroyed and the débris removed from the river channel in such way as to no longer interfere with navigation, at a total cost to the United States of $4,134.96.

(*c*) *Barge No. 2 of Lake Michigan Car Ferry Transportation Company, in Lake Michigan, at a point about 3 miles ENE. ¼ E. from Calumet Harbor breakwater light.*—The wreck of this vessel was reported by the owners who formally abandoned it. It formed a serious obstruction to vessels navigating the southern end of Lake Michigan. The wreck was removed under an emergency contract at a total cost to the United States of $12,468.24.

(*d*) *Tug Macatawa, in Calumet River near Chittenden Bridge.*—The wreck of this vessel was found inside the limits of the river channel now under improvement and had been abandoned by the owners. It was broken up and the wreckage removed in such way as to no longer interfere with navigation, at a total cost to the United States of $240.83.

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APPENDIX M M.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SECOND CHICAGO, ILLINOIS, DISTRICT.

REPORT OF MAJ. C. S. RICHÉ, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Illinois River, Illinois.
2. Operating and care of La Grange and Kampsville locks, Illinois River, and approaches thereto.
3. Illinois and Mississippi Canal.
4. Operating and care of Illinois and Mississippi Canal.

UNITED STATES ENGINEER OFFICE,
Chicago, Ill., July 20, 1908.

SIR: I have the honor to transmit herewith my annual reports covering works in my charge at Chicago, Ill., for the fiscal year ending June 30, 1908.

* * * * * * *

Very respectfully, your obedient servant,

C. S. RICHÉ,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

M. M. 1.

IMPROVEMENT OF ILLINOIS RIVER, ILLINOIS.

(A) BELOW COPPERAS CREEK.

Work during the fiscal year has consisted in inspection of the river throughout its navigable length and building and repairing plant. The river remained above a normal stage the entire year, not reaching at any time within 3 feet of the low water of 1901. This provided a fair boating stage and no dredging was necessary or practicable, except the removing of mud from lock approaches.

Nine round trips were made between La Salle and Grafton to inspect bridges, remove snags, and to investigate alleged obstructions. In the course of these trips two barges of rock were towed from Kampsville lock to the mouth of the Illinois and Mississippi Canal.

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In November, 1907, the steamer *Marion* was transferred to the Illinois and Mississippi Canal, making the initial trip through the canal in that month. In May, 1908, the launch *W. M. Childs*, being worn out and useless for river purposes, was sold at public sale.

Supervision of work in progress under official permits was included with inspection trips.

Three new dump scows were built. A pontoon bridge for the Illinois and Mississippi Canal was built and towed by steamer to its site on the canal.

Repairs were made to two dredges and steamer *Marion*. Repairs were made to steamer *Pearl*, material for new hull purchased, and work upon hull is in progress. A new hull was built for the quarter boat *Margaret*, besides other repairs; office and quarter boat and barge *No. 6* were also put in efficient condition; property was moved out of reach of high water, and many complaints investigated.

The Illinois River is well adapted to improvement by reason of slope and nature of river bed. The State of Illinois, through its legislature, has exhibited great interest in the promotion of a waterway from Lake Michigan to the Mississippi River through this valley. In such an improvement there would be involved three distinct results, the extension of navigation, the disposal of the sewage of Chicago, and the development of an enormous water power. While possibly any one of these three objects is not sufficient at present to induce State action in the matter, the combined weight of the three furnishes a strong argument to the advocates of such a waterway.

The State of Illinois will submit to its voters this fall for approval a bond issue of $20,000,000 to be devoted to building dams and power plants on this waterway between Joliet and Utica.

The accompanying statements show arrivals and departures of vessels to and from St. Louis via Illinois River during the calendar year. This tonnage is but a small portion of the total river traffic.

(B) FROM COPPERAS CREEK TO LA SALLE.

The first appropriation for this stretch of the river was made by the river and harbor act of March 2, 1907, thus definitely placing the whole river from its mouth to La Salle under United States jurisdiction. Project for the improvement was approved by the Department April 6, 1907, the appropriation of $50,000 to be expended for the general purpose of securing and maintaining a depth of 7 feet at low water of 1901, with 200 feet width. Surveys have been made to determine points where dredging is required, and plant is being prepared for such dredging, in connection with dredging on the lower river, the work to be done by hired labor and Government plant. The main obstacle to an earlier undertaking of actual dredging has been the high water. The interval has been taken advantage of to get the plant into good condition and add to the same, the expense being divided between the two sections of the river.

The excursion business at and above the head of navigation at La Salle has been increasing, and complaints have been made of the low bridges at that point.

Work has been proceeding under official permits upon the Toledo, Peoria and Western Railroad bridge at Peoria, now 85 per cent completed; upon the lower free bridge of the city of Peoria, now 70 per

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cent completed; and upon the Spring Valley wagon bridge, now very nearly completed.

The State dam at Henry will at low stages maintain a pool in this section of the river for some 14 miles, forming a natural continuation of the Illinois and Mississippi Canal.

PROPOSED APPLICATION OF FUNDS.

It is proposed to apply the available funds on both divisions of the river, and the additional appropriation recommended for the river from its mouth to Copperas Creek to securing and maintaining a navigable channel of 7 feet depth and 200 feet width from the mouth of the river to La Salle, to maintaining and rebuilding plant, removing snags and other obstructions, and making such local surveys as may become necessary from time to time.

Money statements.

BELOW COPPERAS CREEK.

July 1, 1907, balance unexpended		$70,952.44
Received from sales, etc		244.10
		71,196.54
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$7,468.22	
For maintenance of improvement	3,000.00	
		10,468.22
July 1, 1908, balance unexpended		60,728.32
July 1, 1908, outstanding liabilities		1,000.00
July 1, 1908, balance available		59,728.32
Amount (estimated) required for completion of existing project		142,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$40,000.00	
For maintenance of improvement	10,000.00	
		50,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

COPPERAS CREEK TO LA SALLE.

July 1, 1907, balance unexpended	$48,499.52
June 30, 1908, amount expended during fiscal year for works of improvement	6,892.26
July 1, 1908, balance unexpended	41,607.26
July 1, 1908, outstanding liabilities	500.00
July 1, 1908, balance available	41,107.26

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APPROPRIATIONS.

BELOW COPPERAS CREEK.

June 30, 1880, available from previous appropriations	$38,337.81	August 18, 1894	$35,000.00
June 14, 1880	110,000.00	June 3, 1896	40,000.00
March 3, 1881	250,000.00	March 3, 1899	100,000.00
August 2, 1882	175,000.00	June 13, 1902	75,000.00
July 5, 1884	100,000.00	March 2, 1907	50,000.00
August 5, 1886	112,500.00		1,585,837.81
August 11, 1888	200,000.00	Received from all other sources	1,079.50
September 29, 1890	200,000.00		
July 13, 1892	100,000.00	Total	1,586,917.31

COPPERAS CREEK TO LA SALLE.

March 2, 1907 ..... $50,000.00

COMMERCIAL STATISTICS.

Arrivals and departures of steamboats and barges at St. Louis, Mo., via Illinois River, calendar year 1907.

Month.	Arrivals.	Departures.	Month.	Arrivals.	Departures.
January			August	10	10
February			September	10	8
March	7	7	October	10	10
April	9	8	November	9	10
May	10	9	December	5	2
June	10	10			
July	12	10	Total	92	86

	Tons.
Receipts	9,115
Shipments	7,800

M M 2.

OPERATING AND CARE OF LA GRANGE AND KAMPSVILLE LOCKS, ILLINOIS RIVER, AND APPROACHES THERETO.

These locks and dams have been operated and maintained under the indefinite appropriation provided by section 4 of the river and harbor act of July 5, 1884.

At La Grange lock the river was open to navigation the entire year and boats passed the lock in every month. From July 1 to 20, 1907, all boats passed through the lock; from July 21 to September 20 about one-third of the boats passed through the lock, the rest going over the dam; from September 21 to February 10 all boats passed over the dam.

Repairs were made to river wall spar-track platforms, buildings and grounds were kept in order, mud dredged from entrance to lock, and 19 piles cut and driven as fender piles in entrances to lock.

At Kampsville lock the river was open to navigation the entire year except a short time in December, 1907, when repairs to lock

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gate were in progress. From July 1 to 8, 1907, and from September 12, 1907, to March 8, 1908, all boats passed through the lock; at other times all boats passed over the dam.

Mud was dredged from lock chamber and upper entrance to lock.

The work of rebuilding the lock gates above low water was begun; chords, posts, and filling blocks were framed for all four leaves; three leaves were rebuilt, when a rise in the river stopped the work. Buildings and grounds were kept in order and property cared for.

The accompanying tables show the number of boats navigating the river and the number of times they have passed the locks during the past fiscal year, with details of tonnage.

PROPOSED APPLICATION OF FUNDS.

The funds to be allotted will be used for ordinary maintenance, operation, repairs, contingencies of service, and for completing renewal of gates at Kampsville lock.

Summarized statement of expenses from appropriation for operating and care of canals and other works of navigation (indefinite) applied to La Grange and Kampsville locks, Illinois River.

La Grange lock:		
Services	$5,625.12	
Materials	209.60	
Supplies	95.94	
Travel	5.82	
Total		$5,936.48
Kampsville lock:		
Services	6,226.05	
Materials	21.95	
Materials for lock gates	815.70	
Supplies	265.59	
Telephone	28.20	
Travel	20.59	
Total		7,378.08
Grand total		13,314.56

NOTE.—Owing to extreme high water it was impracticable to complete repairs to Kampsville lock gate, for which $2,500 was allotted.

COMMERCIAL STATISTICS FOR FISCAL YEAR ENDING JUNE 30, 1908.

		Tonnage passing—	
		La Grange lock.	Kampsville lock.
Steamboats	number	635	382
Barges	do	422	127
Tonnage of steamboats		105,619	101,022
Tonnage of barges		84,876	25,023
General merchandise	tons	2,675	5,508
Passengers	number	9,243	19,335
Live stock	head	1,809	26,908
Grain	tons	7,289	2,464
Apples	do	158	229
Coal	do	7,890	1,634
Logs	do	7,605	1,491
Wood	do	250	.....

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List of boats navigating the Illinois River during the fiscal year ending June 30, 1908.

Name.	Tonnage.	Trips passing—	
		La Grange lock.	Kampsville lock.
Alton	809		3
Antionette	54	2	2
Argand	96	2	2
Aurora	49		2
Bald Eagle	468	145	161
Chas. B. Pearce	220	2	2
City of Beardstown	52	29	25
City of Peoria	128	25	17
Columbia	197	2	2
Conquest	92	2	2
Cora	14		2
D'Artignan	26	1	1
David Swain	146	18	2
Dunbar	21	1	1
Ebaugh	50	32	
Eleonore	97	118	23
Falma	14	1	1
Fred Swain	124	2	2
Gallardo	45	1	1
Gardie Eastmann	100		2
Greyhound	12		2
H. W. B	55	2	2
H. W. Longfellow	47	51	3
Ida Mac	33	1	1
Illinois	168	43	16
Irma	11		7
Islander	15	1	1
Japonica	45	1	1
J. S	236	4	2
La Porte	24	1	1
Louise	19		11
Lucille Burt	71	1	1
Mary	50	42	19
Nellie	85		2
Ouatoga	18		4
Peerless	96	4	4
Reliance	13	1	1
R. G. Schmoldt	19	90	20
Spread Eagle	691		2
Theotisee	12		2
Vernie Mac	122	4	4
Watkins	46	1	1
Willema	40	1	1
W. W	167		2
Red Bird	14		1
Mountain State	142		1
Lily	200	2	2

M M 3.

ILLINOIS AND MISSISSIPPI CANAL.

CONSTRUCTION.

At the close of the last fiscal year the principal item of work remaining unfinished was the dam at the head of the feeder. Operations on this work were actively prosecuted during the summer and fall. In spite of delay in getting steel gates delivered and some difficulty in getting labor, the dam was practically completed before cold weather. At the same time the steel emergency gates at aqueduct 9 on the feeder, the emergency gates on mile 23 of the main line, and the erection and flooring of feeder bridges was also completed. Cross banks were removed and the canal was formally opened to navigation October 24, 1907. There still remained to be done much work in the nature of strengthening banks, cleaning ditches, placing snubbing posts, etc., which has continued during the year. Gauges

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have been cut on lock and aqueduct walls and drift and brush removed from the prism.

With the canal partially full of water the United States steamer *Marion* made the trip from Hennepin to Rock Island, reaching the latter point November 15, 1907. Several other boats passed through the main line and up the feeder.

Twenty more lock houses than originally planned have been found necessary. Plans for twenty-five such houses were drawn, cellars and wells dug, lumber and other material purchased, and they are in course of construction.

An application was made to the Department of Agriculture to have the Forestry Bureau cooperate in planting trees on the canal right of way; the advantages of such action are obvious, but no result was obtained.

A permit was issued July 29, 1907, to the Sterling Hydraulic Company to construct a water-power station in connection with the Sterling dam, in pursuance of item in the river and harbor act of March 2, 1907.

The steamer *Marion*, belonging to the canal, which has been with the Illinois River fleet for several years, was transferred back to the canal and fitted up for service.

Several leases were made with private parties giving them the right to occupy and erect buildings on the canal right of way for business purposes, at a minimum rental of $5 per annum.

Forces of lock tenders and patrolmen were employed and organized, and on January 1, 1908, the operating and maintenance of the canal were transferred to the indefinite appropriation for operating and care of canals and other works of navigation, with an allotment of $75,000 for the remaining six months of the fiscal year, which was increased in May to $90,000.

The canal lying empty for many years during construction underdrained part of the adjacent country, but when water was turned in this underdraining ceased and the land reverted to its original condition. At the same time excessive rainfall intervened to make drainage conditions rather worse than they have been in recent years. The result was a large number of complaints from landowners along the canal who attributed the conditions entirely to seepage from the canal and sought to have the United States go outside the right of way to construct drainage ditches and connect them with local drainage systems. As the bottom and banks of the canal become saturated and sediment is gradually deposited it is believed that seepage will diminish and that the canal will prove an aid to the natural drainage of the sections through which it passes.

The operations in detail for the fiscal year were as follows:

Feeder.—At the beginning of the year the cofferdam in Rock River, inclosing site for dam and sluice gates at north end, was in place and water pumped out. The crib dam and the concrete masonry for sluice gates at north end were built and the cofferdam removed except that portion inclosing power station. Twenty-five steel sluice gates were assembled and riveted, and the maneuvering bridge completed. It was found that the operation of the sluice gates involved much hard labor and it was decided to attach counterpoises to them. Plans were prepared for towers of structural iron and the material delivered. It is proposed to make the counter-

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poises of concrete. During the winter it was found that the ice formed in large quantities on the gates, but after some experimenting it was found that it could be readily detached from the steel work by the use of a small amount of hot water applied to the back of the gates. All of the cross banks used as temporary roads were removed. The masonry and superstructure of Highway Bridge No. 45 was completed. The approaches to highway bridges were surfaced and railings built. The Des Fontaines gates across the feeder at each end of the aqueduct over Green River were erected and have worked satisfactorily thus far. The banks were generally overhauled and all holes made by burrowing animals dug out and tamped.

Western section.—Banks were generally overhauled. Cross banks at Lock No. 28 were removed and the canal made ready for use, being opened to navigation October 24, 1907. The steamer *Marion* arrived at the eastern end of the canal November 5; on November 8 she passed through Lock No. 1, but was delayed at Lock No. 2 by the ponton bridge. She passed that lock the following day, reached the summit level November 11, and reached the Mississippi River November 15. Progress through the western section was much delayed by ice. The launch *Mary Mac.* with houseboat *Rambler* in tow, followed.

Plans for twenty-five houses to be built for overseers and lock tenders were prepared, and most of the material distributed by barge to the various sites. Work was begun upon eight of the houses.

Eastern section.—Brush in canal prism was cut and cleared, banks seeded, cross-ties removed, and 110 tons of rubblestone moved to back slope of towpath and delivered to western section. Crabs and spars were placed on lock gates; gates calked, valves adjusted; holes for spillways were cut in gates at Locks 1 to 7, and railings erected around spillways. Seep ditches were cleaned, miles 1 to 28, inclusive, and bars below locks removed. Pontoon bridge was towed from Beardstown to its site near Lock 2 and placed in position, approaches and slope paving built and bridge finished. Crevasses on miles 2 and 8 were closed, splay walls repaired at Locks 2 and 3; the hole in top of Arch Culvert No. 1, cut for drainage, was closed with concrete. Deposit was removed from prism and used in raising and reenforcing banks on miles 2 to 18. Protection levee on mile 8 was black-soiled, embankments raised on miles 2 and 8, and widened and strengthened on miles 18 and 19; highway on miles 15 and 16 was repaired. Bank revetment was relaid on miles 7 and 16 where necessary, approaches to highway bridges 2, 16, 17, and 18 repaired; one-half of barbed wire fence was built on mile 21 along land of L. M. Peterson; other fences repaired.

The emergency gates on mile 23 were completed, cofferdams removed, and plant removed to warehouse at Lock 19. Holes made by burrowing animals were dug into and filled and several hundred of the animals killed with chemicals. Engine house at Lock 19 was wrecked and lumber stored and used for ice house.

A line of check levels was run from Lock 21 to Lock 22. Broken concrete in lower mitersills of Locks 14 and 16 was repaired and mitersill at Lock 12 anchored. Two spans of Aqueduct 2 were waterproofed with neat cement wash. Temporary bridges at Lock 2, mile 5, Locks 6 and 19 were torn down and lumber stored. A base ditch was excavated west of Lock 16 and filled with clay. A ditch was dug near Lock 14 to drain the area between the canal and rail-

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way. A considerable quantity of deposit was removed from the floor of Locks 1 and 9. A driven well was put down at dwelling at Lock 4; a gravel pit was opened on mile 3 for use in house construction. Cellars were dug and concrete foundations placed for houses at Locks 4, 8, 10, 12, 20, 21, and on mile 26, and the overseer's house on mile 26 was completed ready for plastering. Lumber and brick for overseer's house at Lock 20 was received and distributed. Repairs and extensions were made on dwelling houses at Locks 13 and 21. Three carloads of Portland cement for houses was received.

From May 13 to June 18, 1908, the eastern section was closed to navigation pending the repair of damages caused by a crevasse on mile 15. The work of tending locks, patrolling banks, reconstructing telephone line, and maintenance has been carried on under operating and care of the canal since January 1, 1908.

PROPOSED APPLICATION OF FUNDS.

It is proposed to apply the funds available to completing the canal by deepening the outlet into Rock River and the Rock River pool, completing houses, reenforcing banks where necessary, revetting banks, and strengthening points which experience shows to be vulnerable, and miscellaneous work upon towpath, ditches, etc.

Money statement.

July 1, 1907, balance unexpended		$305,837.65
Received from sales, etc		3,792.15
		309,629.80
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$85,957.40	
For maintenance of improvement	44,909.22	
		130,866.62
July 1, 1908, balance unexpended		178,763.18
July 1, 1908, outstanding liabilities		2,500.00
July 1, 1908, balance available		176,263.18
July 1, 1908, amount covered by uncompleted contracts		15,300.00

APPROPRIATIONS.

July 1, 1890, balance unexpended from previous appropriations	$786.46
Act of—	
September 19, 1890	500,000.00
July 13, 1892	500,000.00
August 17, 1894	190,000.00
June 3, 1896	45,000.00
Sundry civil act—	
June 4, 1897	875,000.00
July 1, 1898	1,427,740.00
March 3, 1899	700,000.00
June 6, 1900	1,000,000.00
March 3, 1901	975,000.00
June 28, 1902	733,220.00
Act of March 3, 1905	300,000.00
Sundry civil act June 30, 1906	200,000.00
	7,446,746.46
Received from all other sources	51,580.11
Total	7,498,326.57

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Total expenditures for fiscal year 1908.

Eastern section, Illinois River to feeder junction	$38,108.61
Western section, feeder junction to Rock River	10,304.68
Feeder line	82,453.93
Total	130,866.62

Total expenditures to end of fiscal year 1908.

Eastern section	$3,124,847.94
Western section:	
Around rapids of Rock River	547,229.93
Rock River division	25,470.21
Rock River pool	21,500.00
Feeder junction to Rock River	1,927,672.50
Feeder line	1,672,842.81
Total	7,319,563.39

CONTRACTS IN FORCE.

Name and address of contractor.	Nature of contract.	Date.	To expire—	Remarks.
Russel Wheel and Foundry Co., Detroit, Mich.	Emergency gates, sluice gates, etc.	Sept. 25, 1906	Contingent..	Completed.
Do	Supplemental contract for 6 sluice gates.	Dec. 20, 1906	.....do.....	Do.
James C. Simpson & Co., Galesburg, Ill.	Lumber and mill work for 25 houses for lock tenders and overseers.	Apr. 13, 1908	July 12, 1908	

DESCRIPTIVE AND HISTORICAL SKETCH OF THE ILLINOIS AND MISSISSIPPI CANAL, BY MR. WILBERT L. BONNEY.

LOCATION.

The canal extends from a point about 1.75 miles above Hennepin, on the Illinois River, in a westerly direction, via Bureau Creek Valley, to Rock River, nearly parallel with the Chicago, Rock Island and Pacific Railway; thence in the bed of Rock River to the rapids near Milan, Ill., and thence to the Mississippi River at the mouth of Rock River 3 miles below Rock Island; a total length of main line of 75 miles. The towns along and near the main line are Hennepin, Bureau, Tiskilwa, Wyanet, Langley, Sheffield, Mineral, Annawan, Atkinson, Geneseo, Green River, Colona, and Milan. The feeder extends from the Rock River at Rock Falls, Ill., 29.3 miles southward, meeting the main line in mile 28. At low water the summit level is 196 feet above Illinois River and 93 feet above the Mississippi River. The canal crosses the divide between the Illinois and the Mississippi rivers, ascending some 18 miles by 21 locks, to a summit level 11 miles long, and descending for some 46 miles by 11 locks, to the Mississippi River. The feeder has a fall of 2.3 feet in its entire length and will carry about 300 cubic feet of water per second to supply the canal.

CAPACITY.

The canal is 80 feet wide at water surface, 52 feet wide at bottom, 7 feet deep, with locks 170 feet long between quoins and 35 feet wide, capable of passing barges of at least 140 feet length, 34 feet beam, and 840 gross tonnage. The water is supplied from Rock River and controlled by a guard lock at Rock Falls.

Turnouts have been built every 4 or 5 miles for the accommodation of boats, increasing the width of the canal at points near the locks for lengths of from 500 to 1,000 feet. Where the canal is entirely in excavation, a towpath 16 feet wide is provided, 2½ feet above the water level.

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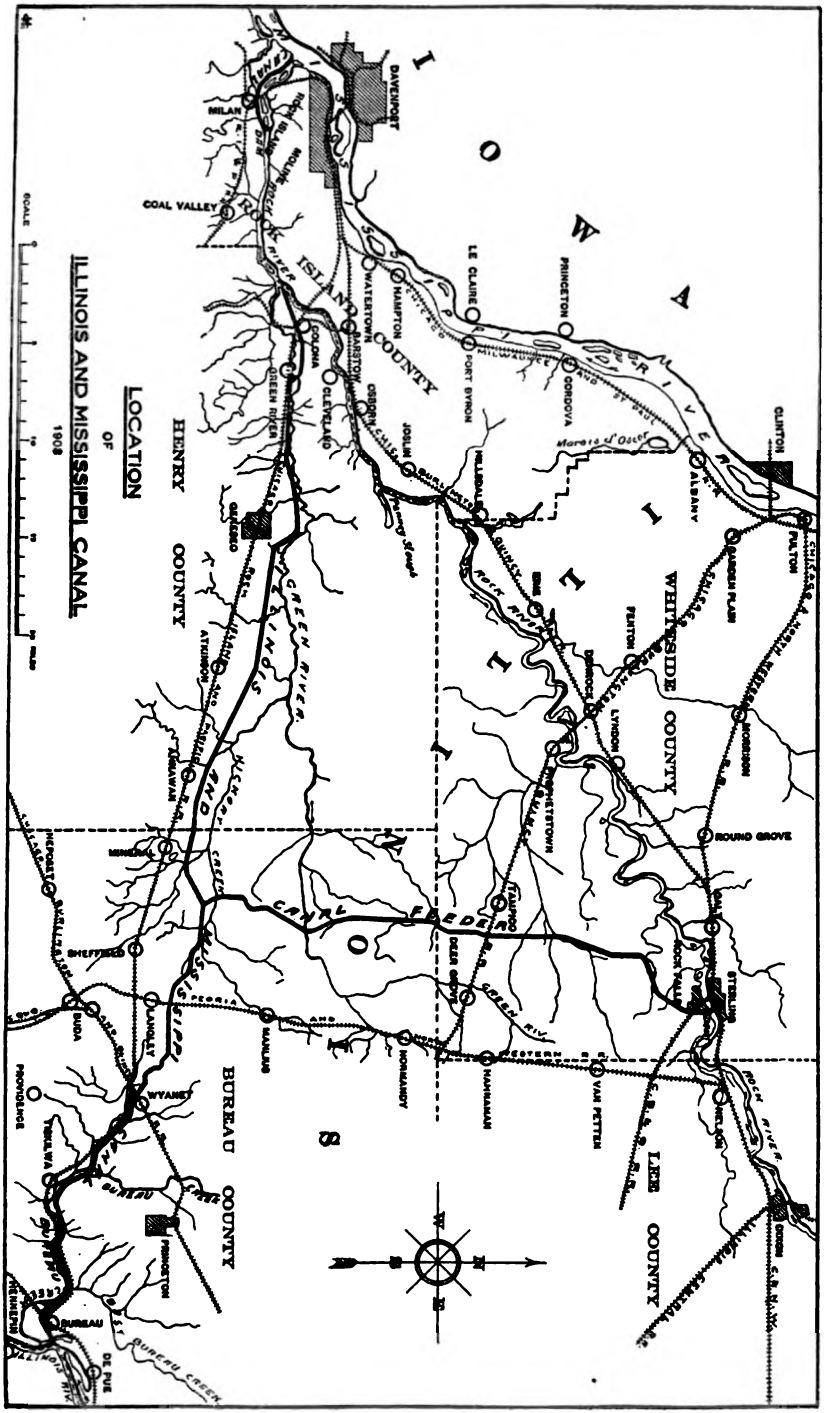

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HISTORICAL.

In 1832 a public meeting was held in Hennepin, Ill., to agitate the building of a canal from the Illinois River to the Mississippi River.

A survey for a 6-foot canal between the Illinois and Mississippi rivers was made for private parties in 1866, by Mr. J. O. Hudnutt. The route ran from Hennepin to Watertown, with a 5-foot feeder from the Rock River at Dixon.

In 1870 the first United States survey was made under the direction of Col. J. N. Macomb, by Mr. Gorham P. Low. This survey followed the Hudnutt route, but contemplated an 8-foot canal, 160 feet wide at water line.

In 1874 an estimate was made for a smaller canal along the same route.

By act of Congress approved August 2, 1882, a survey was ordered and $30,000 appropriated for the purpose. The work was done under the direction of Maj. W. H. H. Benyaurd, by Mr. H. B. Herr. By the same act a survey of the Illinois and Michigan Canal (from Chicago to La Salle) was ordered with a view to enlarging it to correspond with the dimensions of the proposed Illinois and Mississippi Canal; this survey was made in 1882 by Mr. Geo. Y. Wisner, under the direction of Major Benyaurd.

On April 20, 1882, the general assembly of Illinois passed a resolution from which the following extract is taken:

"*Resolved*, That the senate, the house concurring, respectfully memorialize the Congress of the United States to authorize, provide for, and direct, at its present session, an early construction of a canal for commercial purposes from Hennepin, on the Illinois River, westward to the Mississippi River, on the most feasible route."

A Board of Engineer officers was appointed by authority of Congress in 1886 to investigate the relation to commerce of the proposed Hennepin Canal. They reported that in their opinion the benefits to the people affected by it would exceed the cost of construction. For engineering reasons the Board favored what was known as the Marais d'Osier route, terminating opposite Camanche, Iowa, but for commercial reasons the Secretary of War and Chiefs of Engineers Newton and Duane selected the Rock Island route.

It was thought at that time that the contemplated improvements would extend the benefits of the Erie Canal to the upper Mississippi River section. The freight rate on wheat from St. Paul to Chicago and Milwaukee by rail at that time was 12 cents per bushel, and figures were quoted to show that this rate might be cut in half by shipment via the Mississippi River, the proposed Hennepin Canal, and the enlarged Illinois and Michigan Canal. The average freight rate on western railroads which might be affected by the proposed improvements were as follows in 1879:

	Per ton mile.
Chicago, Burlington and Quincy Railroad	01.023
Chicago and Northwestern Railroad	01.49
Chicago, Milwaukee and St. Paul Railroad	01.76
Chicago, Rock Island and Pacific Railroad	01.21
Erie Canal rate for 1880	00.49

The public demand for the Hennepin Canal was exceedingly strong and insistent, representing a wide extent of territory, based upon many indisputable facts and supported by clear reasoning. The following extract is taken from a communication addressed to Gen. C. B. Comstock, president of the Board of Engineers, September 30, 1886, by the citizens of Rock Island, Moline, and Davenport:

"It is important to notice that the construction of that canal has for many years been earnestly desired by a large aggregate of the people of the Northwest.

"Through mass meetings, delegate conventions, resolutions of commercial bodies, continuous publications in the local journals and in the columns of newspapers published miles away, has this desire found reiterated expression. It has also been earnestly voiced in legislative halls.

"The general assembly of Iowa six times, beginning in 1864, and closing at its last session, unamimously memorialized Congress for the establishment of that canal by the General Government. The legislature of Illinois and that of New York have also been earnest in similar appeals to our national lawmakers.

"The most largely attended delegate conventions ever held in the Mississippi Valley for any purpose—that of Davenport, St. Louis, and St. Paul—have explicitly urged the construction of the canal as a national and free highway of commerce. So also have conventions held at Washington and at Chicago. In fact, it is not at all exaggerating to affirm that the records of the entire Union may be vainly searched for evidence that any other work of internal improvement, proposed only, entered upon, or actually completed, has ever had its construction urged and pleaded for by the popular voice with anything like the unanimity and earnestness which has found

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such continuous expression in behalf of the Hennepin Canal. Why this constantly sustained demand if it be not the impelling result of a consciousness of real and pressing need?

"Abundant reasons for this concert and appeal is apparent. It is found in the fact that the upper Mississippi Valley is shut out from participation in the cheap freightage to and from the eastern Atlantic seaboard, which enriches the lake regions, yet is so excluded only by a barrier so comparatively easy of removal that its continuance is rendered particularly objectionable and aggravating. Half a century ago it was seen that nature had, by its location of the Desplaines and Fox rivers, clearly invited human enterprise to connect the waters of Lake Michigan with those of the Illinois River. Just as plainly does nature to-day invite human enterprise and skill to secure a practical commingling of the Illinois and the upper Mississippi by its location of the valleys of Bureau Creek, Green River, and Rock River."

The following is an extract from a letter of Governor William Bross, of Illinois, to the Board of Engineers at the same time:

"The project of constructing a canal from the Illinois River to the Mississippi at or near Rock Island, thus connecting by waterway the largest and the richest wheat-producing section of the Union with the Great Lakes, has been before the country for a score of years. It may be conceded that the main facts and arguments in its favor have been exhausted. Years ago Congress should have completed the canal or its friends ought to have abandoned it. But the rapid settlement of Iowa, Wisconsin, Minnesota, Dakota, and Montana, the vast increase in their cereal, animal, and other farm products, and the vigorous growth of their commercial necessities, intensify the need of its construction, and enlarge the facts and arguments in its favor."

The Hon. Jeremiah Murphy, M. C., Davenport, Iowa, and Gen. Thos. J. Henderson, M. C., Princeton, Ill., were early advocates of the canal and did much to secure its construction.

Expressions similar to those above quoted from many quarters poured in upon the officials having the matter in charge and upon Congress. Reliable figures were adduced to show that the freight rate by rail on heavy products from points on the Illinois and Michigan Canal to Chicago were from two to three times the rate by canal, inadequate though that canal was in capacity.

Coal was carried from Erie to Chicago, nearly 1,000 miles, by water, and by rail in competition, for 64 cents per ton; while the rate by rail from Chicago to the Mississippi River, only 200 miles, was $2 per ton, increasing still further as the carriage proceeded farther from the influence of water competition.

The benefits in the way of reduced freight rates then expected to be derived from the improvements have very largely been realized by reductions by the railroads themselves.

The surveys of the canal were continued in 1885–86 by Maj. Thos. H. Handbury.

In most of the preliminary surveys and reports this canal has been referred to as the Hennepin Canal, and that is the popular name for it now. By act of Congress in 1888 the official name was changed to the Illinois and Mississippi Canal.

FIRST APPROPRIATION.

Under act of Congress of August 11, 1888, detailed plans and estimates based upon the above surveys were required and were submitted in 1890 (House Ex. Doc. No 316, 51st Cong., 1st sess.), the estimated cost being $6,925,960, and the river and harbor act of September 19, 1890, authorized the work in the following provision:

"For the construction of the Illinois and Mississippi Canal to connect the Illinois River at a point near the town of Hennepin with the Mississippi River at the mouth of Rock River, together with a branch canal or feeder from said Rock River to the main line of said canal, $500,000. Said canal and feeder shall be known as the Illinois and Mississippi Canal, and shall be constructed on the route located by the Secretary of War in pursuance of the provisions of 'An act making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes,' which act became a law August 11, 1888, and said canal and feeder shall be 80 feet wide at the water line and 7 feet deep, the locks 170 feet in length and 30 feet in width, and shall have a capacity for vessels of at least 280 tons burden, with guard gates, waste weirs, locks, lock houses, basins, bridges, and all other erections and fixtures that may be necessary for safe and convenient navigation of said canal and feeders, and shall be constructed on plans and specifications to be approved by the Secretary of War: *Provided*, That the Secretary of War shall in his discretion change or alter the dimensions of the locks of said canal and feeder if in his opinion the cost of said improvement is not thereby increased.

"It shall be the duty of the Secretary of War, in order to secure the right of way for such canal and feeder, to acquire title to such lands as may be necessary by agreement,

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purchase, or voluntary conveyance from the owners, if it can be done on reasonable terms; but if that should be found impracticable, then the Secretary of War shall apply at any term of the circuit or district court of the United States for the northern district of Illinois to be held thereafter, at any general or special term held in said district, and in the name of the United States institute and carry on proceedings to condemn such lands as may be necessary for right of way as aforesaid; and in such proceeding said court shall be governed by the laws of the State of Illinois, so far as the same may be applicable to the subject of condemning private property for public use; the Secretary of War to cause said work to commence as soon as practicable by the construction of one of the locks and dams on said Rock River at such point as he may deem most advisable, and shall cause said work to be constructed in accordance with the foregoing provisions and of permanent and substantial materials and in a good and workmanlike manner."

Work was begun on locating the canal in November, 1890, under Maj. W. L. Marshall, Mr. L. L. Wheeler and Mr. Jas. C. Long being assigned the duty of locating the canal on the ground and negotiating for right of way. Actual construction work began in July, 1892, at the mouth of Rock River.

In all the early official discussions of routes and dimensions it was assumed that the canal was designed as a link in a cut-off or short route from the upper Mississippi River to Lake Michigan, for navigation by Mississippi River steamboats or barges, and the size of locks was fixed with that purpose in view.

The law prescribing an eight-hour day for laborers went into effect August 1, 1892, and its effect upon this work is mentioned below.

On April 28–29, 1891, the senate and house of representatives of the State of Illinois by joint resolution ceded to the United States jurisdiction of lands acquired for right of way of the canal.

On May 11, 1891, the Secretary of War approved Major Marshall's recommendation that the width of locks be increased from 30 to 35 feet and that they be constructed of concrete.

The work on this canal, from 1894, marked the beginning in America of construction of concrete without stone facing applied to canal locks. Approximately 240,000 cubic yards of concrete has been used in locks, piers, abutments, and aqueducts. The methods applied in depositing concrete were in the main developed by Major (now Colonel) Marshall. Exceedingly exhaustive tests of cement were carried on, and as a result American brands of Portland cement were found at least equal to German and Swedish cements, and were used in nearly all the canal construction. The specifications for Portland cement developed by Colonel Marshall in this work have since become standard.

That Colonel Marshall's substitution of concrete for cut stone was an important and wise action, although not in accordance with tradition, has been amply proven, and may be indicated by the following extract from the Report of the State Engineer of New York, 1903, page 62:

"The great improvement during recent years in the manufacture of American Portland cement and the advantage and economy to be obtained by substituting concrete for the much more expensive cut-stone masonry, have been fully recognized, it being considered that the use of the best class of concrete instead of cut stone will give better results at less than one-half the cost."

The same conclusion is expressed in the following extract from a communication from the sanitary district of Chicago to a Board of United States officers, October 20, 1900, the writers having had extended experience with concrete:

"There is a reduction also in the cost of materials, and in nothing is this more marked than in that great staple, Portland cement. America is no longer dependent upon England and Germany for this product. * * * As object lessons in its successful use the locks on the Hennepin Canal stand as monuments in our own country and the ship locks of the Soulonges Canal in Canada."

The average cost of Portland cement concrete used in the feeder guard lock in 1902, built by hired labor, is computed at $6.48 per cubic yard, with cement costing $2.79 per barrel, delivered. Concrete in lock foundations built later by contractors was paid for at contract price of $7.29 per cubic yard.

Before actual construction of the canal was undertaken there were swamps along the rignt of way at points so soft that teams could not traverse them, and little attempt was made to cultivate such lands, while transportation of material for the canal by team was impracticable, insomuch that this was the principal factor in determining the installation of a construction railway. These swamps were drained by the canal work, the land reclaimed, and farmers along the banks began cultivating the reclaimed land, which proved exceedingly fertile.

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The difficult work of securing the right of way, describing the various tracts, negotiating with owners, preparing condemnation cases, perfecting titles, and protecting the United States against unreasonable claims devolved upon Assistant Engineer L. L. Wheeler, who carried through the vexatious details of this work as efficiently, as he has carried out all work of construction under his charge.

The extreme western section of the canal was formally opened to navigation April 17, 1895, consisting of 4½ miles of waterway, 2 dams, 3 locks, 2 swing bridges, and 7 Tainter gates. This section has since been operated continuously.

By the river and harbor act of June 3, 1896, Congress placed the canal under the continuing-contract system and limited to an average of $400,000 per annum the amount of contract obligations which could be incurred in any one fiscal year. The provision of the law referred to is as follows:

"For the construction of the Illinois and Mississippi Canal: * * * Provided, that the Secretary of War may enter into contracts for the whole or any part of such material and work as may be necessary to complete the present project of said Illinois and Mississippi Canal, or the materials may be purchased and the work done otherwise than by contract, and to acquire such further right of way as may be necessary for the said canal, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate five million seven hundred and ten thousand nine hundred and sixty dollars exclusive of the amount herein appropriated: Provided, that in making such contract or contracts the Secretary of War shall not obligate the Government to pay in any one fiscal year beginning July first, eighteen hundred and ninety-seven, more than twenty-five per centum of the whole amount authorized to be expended."

"SEC. 5. That under the authority to make contracts for materials and work, under the provisions of this act, in addition to the sums appropriated herein, the Secretary of War shall not obligate the Government to pay, in any one fiscal year beginning July first, eighteen hundred and ninety-seven, more than four hundred thousand dollars upon the said contracts for any one of the works herein placed under the contract system, except as herein otherwise specifically authorized to do; Provided, any part of the annual allotment herein provided for not earned and paid for material furnished or work done in one fiscal year may be paid for material furnished and work done under the contracts in any subsequent fiscal year; Provided further, that nothing herein contained shall be so construed as to prevent the Secretary of War from making contracts for the whole or any part of the works placed under the contract system in such manner as may be deemed best, payments, however, to be made as stated in this section."

Appropriations for the work were made with regularity in amounts as shown below:

APPROPRIATIONS.

July 1, 1890, balance unexpended from previous appropriations	$786.46
Act of—	
September 19, 1890	500,000.00
July 13, 1892	500,000.00
August 17, 1894	190,000.00
June 3, 1896	45,000.00
Sundry civil act—	
June 4, 1897	875,000.00
July 1, 1898	1,427,740.00
March 3, 1899	700,000.00
June 6, 1900	1,000,000.00
March 3, 1901	975,000.00
June 28, 1902	733,220.00
Act of March 3, 1905	300,000.00
Sundry civil act June 30, 1906	200,000.00
	7,446,746.46

The above provision in the river and harbor act of 1896 and the rate of appropriating money under the original estimate largely determined the rate of progress on the canal when operations were at their maximum during the five years following the

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passage of the act, as will be seen by the following expenditures for each year during construction:

1891	$11,755.36	1901	$971,707.35
1892	25,235.61	1902	575,605.54
1893	153,612.88	1903	380,152.62
1894	269,267.00	1904	458,601.68
1895	351,090.37	1905	587,692.25
1896	360,014.96	1906	428,381.15
1897	32,912.37	1907	267,755.82
1898	545,017.58	1908	130,866.62
1899	856,201.78		
1900	913,692.45	Total	7,319,563.39

Upon the completion of the canal at Milan, Ill., a party was organized under Mr. Wheeler for the survey and location of the feeder line. In the winter of 1890–91 some gentlemen of Sterling, Ill., suggested the possibility of leading the feeder from above Rock Falls or Sterling instead of from Dixon, and presenting their proposition to the Secretary of War, procured, at their own expense, a preliminary examination of the proposed route, with profiles and estimates.

This line evidently required the lowering of the summit level about 9 feet, and offered as further advantages a material shortening of the feeder, 18 feet less lockages over the main line, diminution by 3 of the number of locks, and a shortening by about one hour of the time of transit of the main canal and escape from complications due to the interference either with public streets at Dixon or with the drainage of the town. Mr. Wheeler was therefore instructed to carefully resurvey the Dixon line, and also make detailed surveys and estimates for a feeder from Sterling. The surveys were made and resulted in the adoption of the Sterling route.

The earthwork throughout was advertised in sections of 4 miles or more as far as practicable, and each mile let to the lowest responsible bidder for the work.

A portion of the main line between miles 20 and 23 was located through what is known as Cecils Slough, the borings indicating stable material; but on opening the work it was found to overlie a peat bog. Alternative lines were considered as early as 1893. A contract for the earthwork through these miles was let October 6, 1897, to the Globe Construction Company, of Cincinnati, Ohio. Two years later when their contract expired they had completed only 30 per cent of the work. It was demonstrated that the slope of the cut, although stable when dry, became subject to flow when wet. These contractors failed to drain their work properly. The summit of the divide between the valleys of the Illinois and the Mississippi rivers is on mile 22, and the original surface of the whole summit level is a heavy red clay mixed with pebbles, furrowed into ridges and depressions, probably by glacial action. As the clay is impervious to water lakes were formed by surface water in depressions having no drainage. These lakes were filled by the erosion of the ridges and by vegetable matter which decayed slowly, being submerged most of the year, and thus swamps were formed, the material being fluid when wet and combustible when dry.

This swamp is about 2 miles long and 1 mile wide. Borings show 20 to 50 feet of decomposed vegetable matter with pockets of quicksand. This condition of the soil was not disclosed to Major Marshall in original reports made to him, and as soon as he learned the facts he recommended that a new location through this section be sought.

Surveys were made of several alternative lines, but finally it was decided most practicable to follow the line as originally surveyed. The problem of carrying the canal through this slough has been considered at different times by the officer in charge and by a Board of Engineer officers (1901), and presented an interesting and difficult situation. The plan of construction finally adopted was the result of the deliberations of the board of officers, modified somewhat in the interests of economy as the experience of the officer in charge developed the conditions to be met. The plan of excavation by means of an overhead cableway, with towers about 500 feet apart, was believed to be the most practicable and has given gratifying results. The contractors having failed in their work, it was carried out by the United States by hired labor at considerably less cost than estimated.

FEEDER HIGHWAY BRIDGES.

The building of 21 highway bridges over the feeder was long delayed by litigation. In the summer of 1900 certain highway commissioners enjoined the United States officers and agents from building the bridges of the dimensions contemplated, demanding various departures from design in the matter of grades, widths, and location. It was not until 1906 that a decision was rendered in the district court practically sustaining the United States in every particular in regard to the bridges, except in the

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HIGHWAY BRIDGE NO. 44 AT ROCK FALLS.

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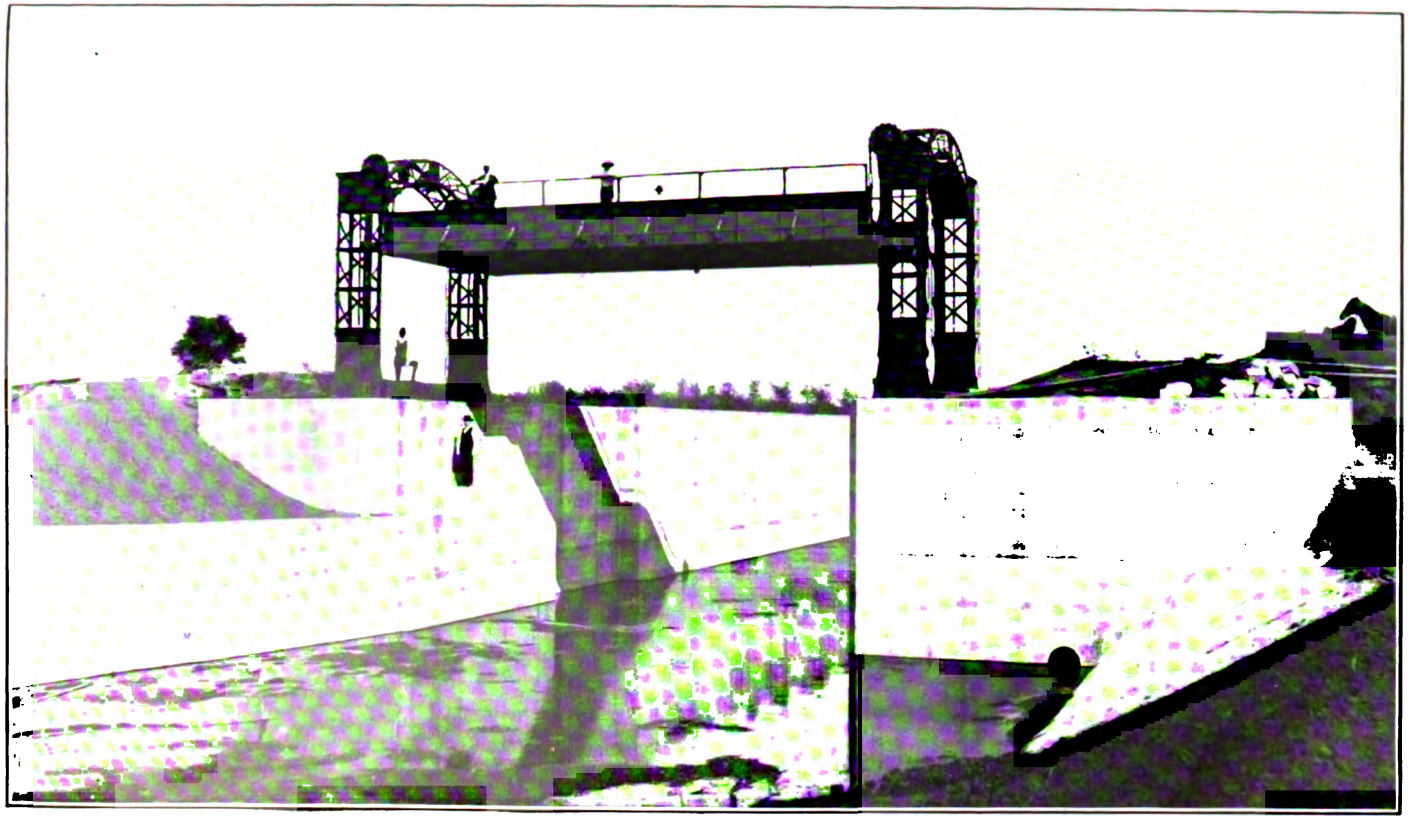

HIGHWAY LIFT BRIDGE NO. 40 OVER LOCK NO. 26.

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MILE 58, LOOKING EAST TOWARD LOCK NO. 27.

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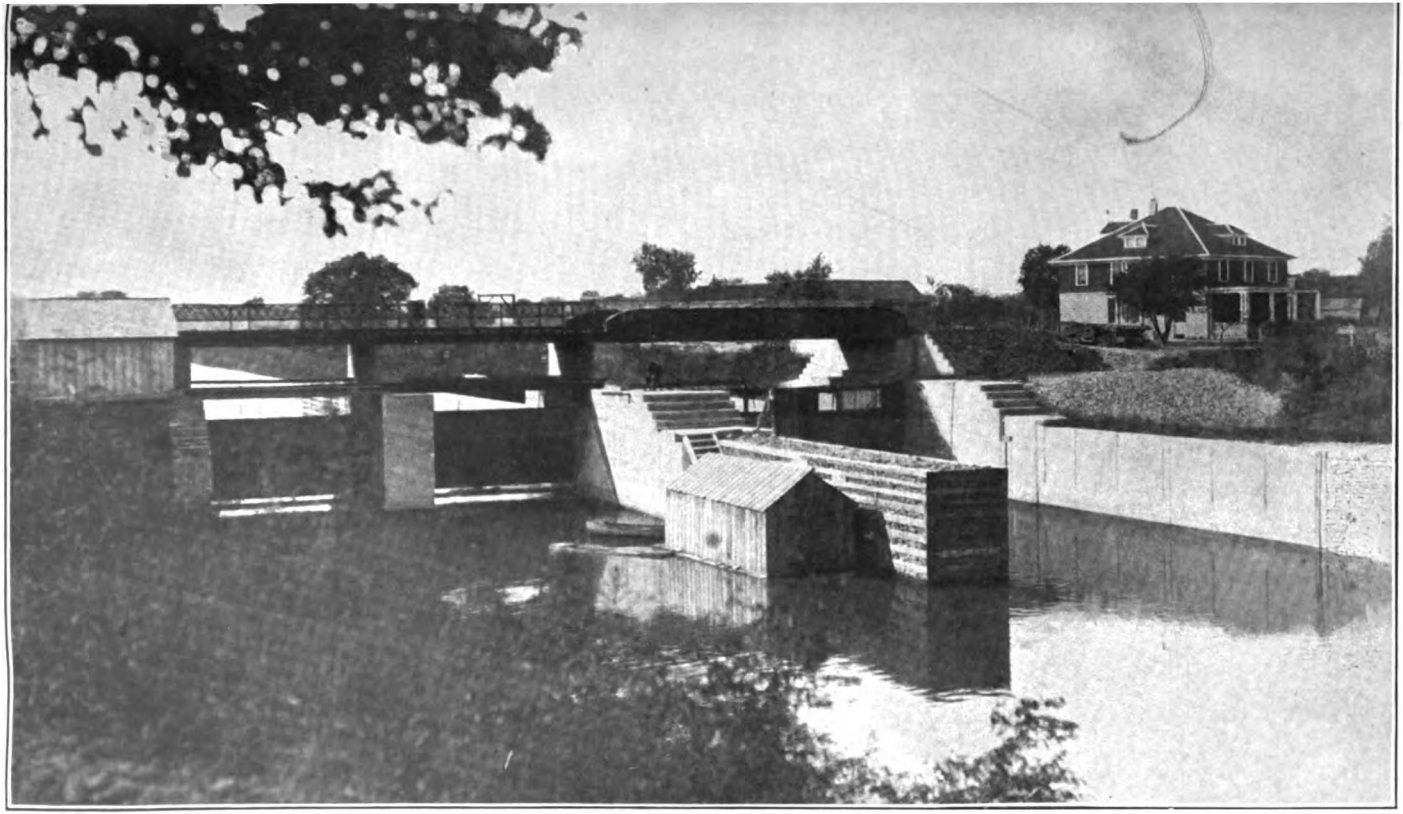

GUARD LOCK AND SLUICEWAY AT HEAD OF FEEDER.

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matter of grades. The court ordered that the grades be reduced to 4 per cent. As the highway commissioners had six months in which to appeal from the decision, and as some of them did actually file appeals, it was considered best to make some concessions to them and secure their waiver of their right of appeal, so that construction of the bridges could be undertaken. This was done and the long litigation ended.

This feeder bridge litigation hindered the work on the canal, directly and indirectly, to a considerable extent, preventing the removal of cross banks at highways and construction of abutments. If these 21 bridges could have been let at the proper time, they could have been built in connection with other bridges on the canal at less cost for labor and material, and at a time when prices were considerably lower.

The clearance under these bridges was reduced from 17 to 12 feet, and the location of bridge No. 45 was changed.

On the western section the location of the lock near Colona involved changes in the grade of two railroads that intersect near that point. The lock site was moved eastward, so the railways should cross the lower level. The change was satisfactory to the railroads and resulted in a net saving to the United States.

Several contractors were obliged to forfeit their contracts by reason of unfavorable natural conditions, too low prices, or inefficiency. Miles 20–23, eastern section, miles 9–11, feeder, mile 34, western section, and foundations of locks and aqueducts on western section were thus abandoned by contractors and completed by hired labor by the United States. The canal has furnished local employment to residents along the line and their teams for many years.

STERLING DAM.

The discussion of plans and location of the dam at the head of the feeder dates back to 1900. Many forms of movable dam were considered. There was involved the difficulty of complying with the decree of court, the complications liable to arise over injury to private interests, and the necessity of compromising with the Sterling Hydraulic Company for the conservation of their existing interests in the water power secured to them by State charter and by long, undisputed possession. The progress of the negotiations in this matter was made the subject of many special reports. The demands for compensation were at first excessive, and the matter was discussed at many conferences with representatives of the company. Alternative plans were considered, and work on the dam postponed pending some settlement which would insure the United States freedom from injunctions and from damage claims. Finally, on December 6, 1906, the Sterling Hydraulic Company agreed in writing to accept the plans for the dam at the original site, waiving their claims for damages upon condition that certain legislation be enacted by Congress relating to volume of water to be abstracted from Rock River by the canal. In pursuance of this understanding, the desired item was incorporated in the river and harbor act of March 2, 1907.

Rock River is about one-fourth of a mile wide at this point and the dam raises the water about 9 feet above the crest of the power company's old dam in order to obtain the level required for the canal. Flowage damages were paid for 1,436 acres of land. An inland lake some 16 miles long is created, a flood discharge estimated as high as 40,000 cubic feet per second is provided for, and the water power privilege has been preserved. A sluiceway 35 feet wide closed by a needle dam is provided at the south end, which may in future constitute the upper end of a lock, such lock having been authorized by Congress, but no appropriation having been made for it.

At Milan about one-half mile of rock was found, which was blasted and placed as riprap.

A half mile of rock was encountered at the head of the feeder. The cut was as much as 10 feet in places, and a steam-shovel outfit was purchased for its excavation, which was accomplished at less than 50 cents per cubic yard. The rock was used for riprapping the feeder a distance of some 20 miles.

A small amount of rock was found near Colona.

The wagon bridge at Moline, across Rock River, was built at a cost of $25,000, not included in the original estimates.

The canal is crossed by four different branches of the Chicago, Burlington and Quincy Railroad and by the main line of the Chicago, Rock Island and Pacific at two points, and once each by the Rock Island and Peoria Railroad and the Peoria branch of the Chicago and Northwestern Railroad.

The bulk of the earthwork on the canal was executed several years ago when prices for such work were comparatively low, and although maintenance charges accumulated a net saving has resulted. On some of the miles the prices paid were not more than one-half of the amount that would be asked were the work to be let to contract under present conditions. The same applies to purchases of timber, steel, cement, and supplies.

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LOCAL SENTIMENT.

The apparent antagonism of some of the people along the line has been at times an obstacle to construction. The opposition to plans for the Sterling dam forced the engineer officer in charge at one time to consider the feasibiltiy of building a pumping station at Green River and operating the canal without the feeder. Petitions, complaints, claims, and threatened injunctions have embarrassed the work. Such matters have always been investigated, and have in most cases been settled amicably. In many cases the complaints were not well founded and in some cases relief could not be granted by an executive officer.

That the local sentiment has not always been hostile, however, may be shown by the following extract from the Rock Falls Gazette of October 6, 1904:

"A glance at the map of the United States should convince any one that a waterway for barges across the State of Illinois connecting the Mississippi River and its branches with the Great Lakes is quite as important to the internal commerce between the East and the West as the ship canal across the Isthmus of Panama is to our commerce with other nations.

"It is of special advantage to Illinois, in bringing products of the East and South, which are necessary to sustain our manufactories, to our very doors, at a nominal expense. And yet there are many people in our midst who declare that the Hennepin Canal, with a navigable feeder, which will be accessible to Sterling, Rock Falls, and Dixon, will be of no practical advantage to these cities."

Local understanding of the efforts of the Government is also shown by the following from the Sterling Standard, February 8, 1905, announcing change in location of Sterling dam:

"As soon as the dam is built and the canal opened for traffic there will be great reductions in freight rates for manufactured articles from Sterling and Rock Falls. Dockage can be made anywhere between the dam and the mouth of the feeder and the goods can be shipped direct to any Mississippi River point without paying the stiff tariff of the railroads. On some kinds of goods manufactured here the freight rates, especially to points south, are entirely prohibitive, even being heavier than the express rates to the same points. This condition will be entirely done away with when the canal is opened. Manufacturers here have been taking goods overland to Clinton and other Mississippi River points for shipment to river towns up or down. They say that they save much on these shipments even after paying for hauling to the river. When the goods can be shipped direct by water the saving will be even greater."

SANITARY CANAL.

It is to be noted that the sanitary and drainage canal, a 26-foot channel from Chicago to Lockport, was begun in 1892, and water turned through it in 1900, the building thus covering part of the period of construction of the Illinois and Mississippi Canal. This canal cuts through the divide just west of Chicago, and will prove of great importance to navigation should a navigable connection be made at its lower end.

INCREASED COST.

An act of Congress approved August 1, 1892, provided that laborers should not be required or permitted to work more than eight hours in a day, whether employed directly by the Government or by contractors on Government work. This law was enacted after the estimates for the canal had been prepared on a ten-hour day basis and submitted to Congress. The result was an increase in the cost of labor of 25 per cent over the estimated cost, which had to be met by rigid economies in other directions. At the time this law went into effect certain parts of the work, near Milan, Ill., had been advertised, proposals received, and contracts awarded and prepared. Upon the passage of the law the work was ordered readvertised on the basis of the new law. This was done and resulted in a new letting at much higher prices, and in a claim for damages by one of the successful bidders at the first letting.

Doubt arose as early as 1896 about completing the canal within the original estimate of cost. When the estimate of 1890 was made the canal had not been finally located, and many changes were made, orders of court intervened, additional works were authorized, or ordered, such as Moline Bridge, excessive awards were made for lands, damage, and flowage, a State law was passed stipulating a higher test load for highway bridges, and litigation interfered with the most economical order of work at some points. The railway bridges were changed from swing to fixed span, adapted to the heaviest modern engines at high speeds, and the courts decreed that service

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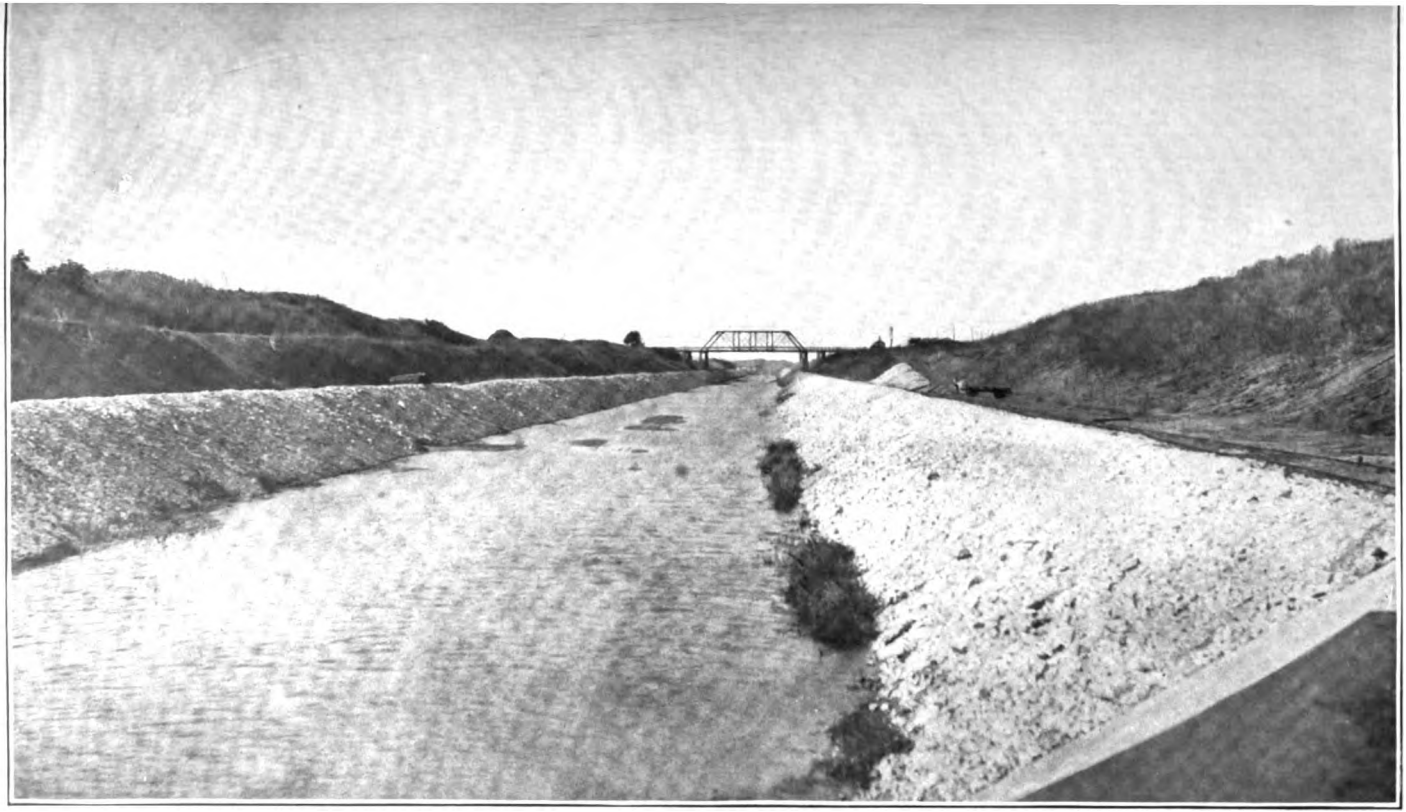

MILES 60 AND 61 COMPLETED AND RIPRAPPED.

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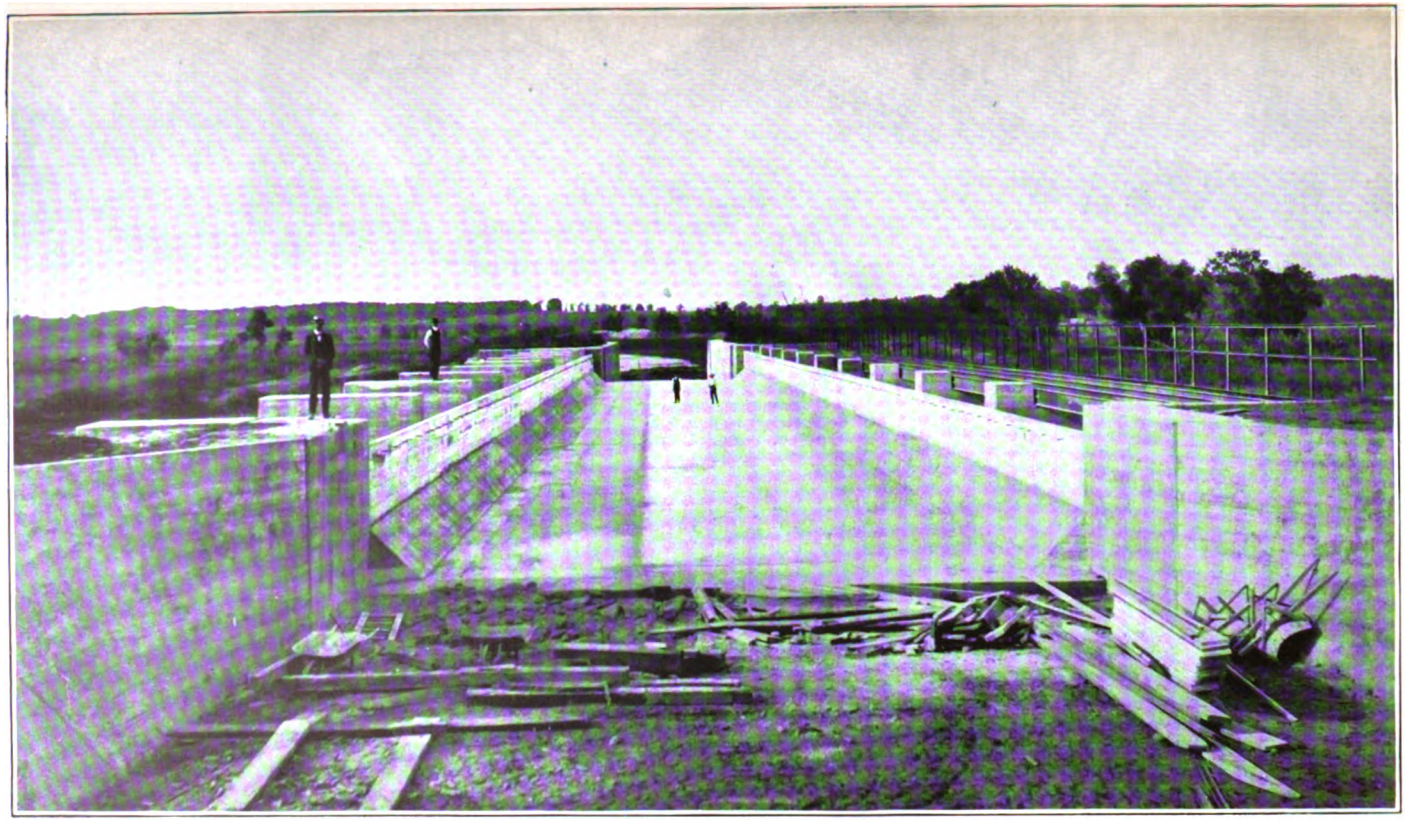

LINING AQUEDUCT NO. 8 WITH REINFORCED CONCRETE.

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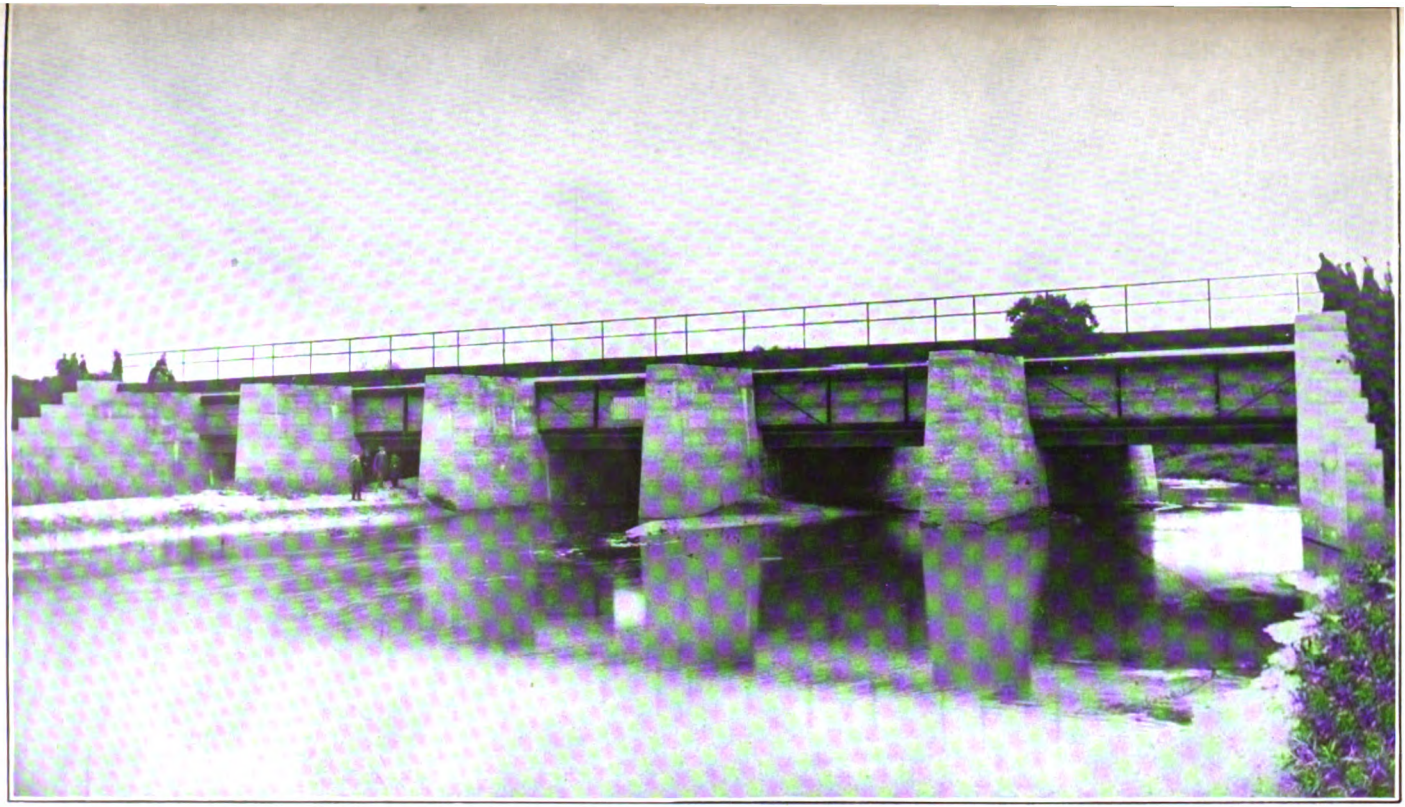

AQUEDUCT NO. 9 FROM DOWNSTREAM SIDE.

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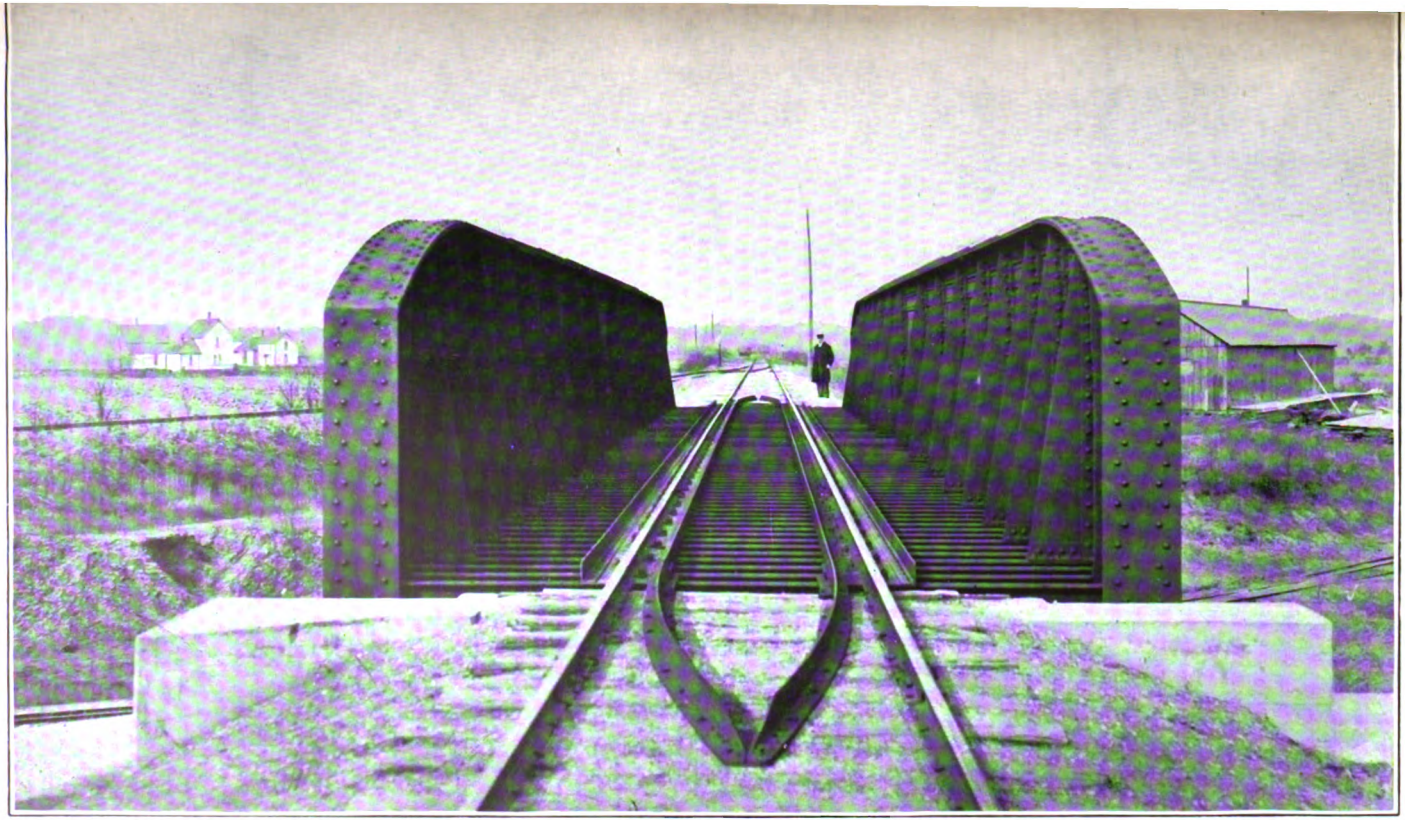

RAILROAD BRIDGE NO. 1, NEAR ROCK FALLS, ILL.

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hould be maintained during construction of such bridges—a very expensive provision. Important economies were practiced, especially in substituting concrete for cut-stone masonry throughout. As the canal does not pass through towns, expensive city bridges were avoided.

In the estimate of 1890 it was assumed that Rock River was a navigable water of the United States and that bridges over it would be so constructed by the owners as not to obstruct navigation. An effort was made to compel the city of Moline to reconstruct its wagon bridge over that portion of the canal in Rock River so as to admit the passage of boats. An appeal was made by the citizens to Congress, and by Congressional action $25,000 was set apart from canal funds to reconstruct the bridge.

A Board of Engineers reported July 3, 1901 (E. D., 7867–176), that the increased cost over the original estimate, due to the above causes, would probably amount to $1,292,783.46 if the canal were to be completed for practical purposes.

With the progress of the work effective economies were achieved, and some work desirable but not absolutely necessary was omitted. The result was that on January 12, 1905, it was possible to report that upon certain conditions the canal could be opened to navigation with an additional $500,000 over the original estimate. The estimate then made of the required work and the view of the conditions which would govern the completion of the work have been justified by events. With the canal opened to navigation a small balance remains for such finishing work as attaches to enterprises of this magnitude.

The right of way cost $468,808.18, and flowage rights $103,786.93 additional, together constituting more than 7 per cent of the cost of the canal.

If other work of this nature were to be undertaken by the United States it would seem reasonable to ask the owners or local interests who are to benefit by the improvement to donate the right of way and to relieve the Government of contingent damages. Not only would this reduce the cost to the United States, but it would give local communities a stake in the improvement, the lack of which has at times resulted in friction in the progress of the work now under consideration.

STRUCTURES ON THE CANAL.

There are 33 locks built of concrete. Ordinary miter gates were used for all lower gates and for all but 14 upper gates. These 14 were fitted with an automatic gate with air chambers, specially designed by Col. W. L. Marshall, Corps of Engineers. Detailed designs of three locks, with cuts of completed work, will be found in the Annual Report of the Chief of Engineers, U. S. Army for 1894, following page 2176.

The canal further includes 67 highway bridges, 8 railway bridges, 2 ponton and 1 farm bridge, 9 aqueducts lined with reenforced concrete, 62 culverts, 3 dams, 34 sluiceways, lock houses, etc. The total earthwork executed has been approximately 13,700,000 cubic yards. Two emergency gates of the Desfontaines type on the feeder and one mitering emergency gate on the summit level are somewhat novel and worthy of note. The cost of the canal to June 30, 1908, has been $7,319,563.39, exclusive of expenditures from the permanent indefinite appropriation for operating and care of canals, etc., applied to operation of the canal.

ICE CUTTING ON THE CANAL.

Since 1895 the privilege of cutting ice from the finished parts of the canal has been sold to private parties each winter and some revenue derived for the benefit of the miscellaneous receipts of the Treasury. This will be a source of greater revenue with the canal completed, as well as a convenience to residents along the line.

MAINTENANCE.

The maintenance of the finished parts and structures during the fifteen years of construction has constituted a considerable expense. As work proceeded the finished parts must be kept in repair. The canal prism was subject to fill and the banks to slough. Burrowing animals did some damage and freshets in adjacent streams caused washouts. Wooden bridge floors had to be renewed and steel work repainted, drainage ditches kept open and right of way fence renewed. No account was kept of these expenditures prior to 1900, but since that date they have been as follows:

Eastern section	$72,092.85
Western section and feeder	22,573.59
Moline Bridge	25,000.00
Total	119,534.14

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This amount, not originally estimated for, came out of the construction funds.

It is now estimated that the operation and maintenance of the canal and structures will require from $150,000 to $200,000 per annum, or approximately 2 per cent of the total cost of the work. This estimate does not cover the rebuilding of any large items nor any serious accidents which might render a larger sum necessary in some years.

OFFICERS IN CHARGE.

Maj. (now Brig. Gen.) W. L. Marshall was in charge of the work, when it was undertaken in 1890, and remained in charge until December 31, 1899, when Maj. (now Col.) J. H. Willard assumed charge. Major Willard remained in charge until July 31, 1903, when he was relieved by Maj. C. S. Riché, who was in charge until April 20, 1905, when he turned the work over to Maj. (now Col.) W. H. Bixby. Colonel Bixby retained charge until April 30, 1906, when he turned the work back to Maj. C. S. Riché, who has remained in charge since that date.

During the time Maj. (now Brig. Gen.) W. L. Marshall was in charge of the work he was assisted at different times by junior officers, First Lieut. (now Maj.) Henry Jervey and First Lieut. (now Maj.) Chester Harding.

All officers in charge have been assisted by Assistant Engineer James C. Long and Assistant Engineer L. L. Wheeler, who have been connected with the work from its inception.

OPENING TO NAVIGATION.

Water was turned in from Rock River in the fall of 1907. The U. S. steamer *Marion*, provided with sheet-iron guards to break the thin ice, passed through from the Illinois River, reaching Geneseo on November 13, 1907, and Rock Island on November 15; several other boats followed, passing through the canal and up the feeder to Rock Falls.

PROSPECTIVE COMMERCE.

The quantity of commerce through the canal can not be predicted and its character can only be suggested. The country through which it passes is agricultural and the only large towns on the route are at the western terminus. Several applications have been filed, and granted, for the privilege of erecting coal and ice sheds and other structures on the right of way.

Coal underlies the land at some points on the right of way, but whether in commercial quantities and conditions remains to be determined. The canal affords a connection with Illinois River as far up as it is navigable (about La Salle) and as there are many flourishing manufacturing towns on that river it is natural to suppose that some of their products may be distributed by way of the canal, consisting of coal, tile, brick, stone, cement, distillery and foundry products. Grain and possibly live stock will be transported by the canal. On the west the heavy merchandise of Moline, Rock Island, and Davenport may supply some traffic for the canal. But the first practical use will probably be in passing launches, house-boats, and pleasure boats from the Chicago district, upper Illinois River, and Illinois and Michigan Canal into the Mississippi and Rock rivers.

It should be stated that this canal was originally projected as a link in a waterway from Lake Michigan to the upper Mississippi River, and it was contemplated that the system should include a cut from Chicago to the upper Illinois River. Several surveys for this work have been made. The sanitary district has completed its deep channel from Chicago to Lockport, emptying into the Des Plaines River. When the Illinois and Mississippi Canal was first undertaken its usefulness as an independent waterway was not expected to be important.

According to reports of the Secretary of Agriculture the value of farm products, not including live stock, of the United States, increased from $2,460,170,454 in 1890 to $6,974,000,000 in 1906. As the farming section traversed by the canal has prospered at least as much as other parts of the country, it may be assumed that the value of agricultural products has increased from 200 per cent to 300 per cent from 1890 to 1906, which period approximately covers the construction of the canal. The early advocates of the canal have been fully justified by events, so far as concerns their predictions of agricultural development and increased need of transportation.

The development of commerce upon new transportation routes requires time, even where the advantages of the new route are undoubted. While the demand for this canal was formerly insistent, it subsided to a marked degree, and now that the canal is available the demand from shippers, dealers, and producers can be expected to develop anew when it is demonstrated that this channel is practicable and profitable for their purposes. But this can not be accomplished at once.

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OPERATIONS IN 1908.

When the canal was ready for watering in the fall of 1907 a force of patrolmen was organized to watch the banks closely, a precaution which will be necessary during at least the first year of operation. In May, 1908, a break occurred on the eastern section near Aqueduct 3, which required the emptying of the prism and hauling in of several thousand cubic yards of gravel and earth. A number of barges have been built which, with the steamer *Marion* and other boats, will be maintained and kept for the purpose of revetting, dredging, and repairing.

When the water was turned into the canal, the excavated portions which had served as a drainage ditch for many years ceased to underdrain the land. At the same time unusually wet weather aggravated the drainage conditions. Farmers entered complaints, charging the conditions entirely to seepage. The matter was carefully considered, drainage ditches opened on the right of way, and provision made for gradual deposit of sediment to render banks and bottom impervious.

Twenty-five houses are being built for lock tenders and overseers, in addition to 14 already built, and a telephone line to connect the controlling works with points along the line is in process of construction.

Much the greater part of the cost of the canal has been for labor, and the entire cost of superintendence, engineering, and office during the fifteen years of construction has not exceeded 5 per cent of the cost of the work.

GENERAL.

The early advocates of the Illinois and Mississippi Canal fully realized that the value of a waterway lay largely in its continuity. The successful competition of railroads with waterways became possible mainly by reason of the continuity of railroad routes, and the tendency in railroad building has been steadily toward closer connections, through trunk lines and consolidated systems. On the other hand the waterways of the country were then, and are still to a less extent, roughly analogous to a system of unfinished railways, of local importance only but capable of attaining indefinitely great value by the construction of proper connecting links The utility of a waterway increases in greater ratio than its length.

While canals have not been successful in their competition with railroads in sparsely settled districts, they have more than held their own in densely populated sections, both in the United States and abroad, wherever commerce can be intensively developed. This would indicate that the real importance of canals lies in the future.

In the present state of transportation problems in the United States one of the most obvious advantages of free navigable waterways is the fact that they preclude monopoly. Any person can enter the transportation business who commands a boat and outfit, while rail transportation requires enormous capital and is in its nature exclusive of small independent owners. The waterways of the country would no doubt have been connected long ago, by private enterprise, except for the fact that they, by their very freedom to all comers, can not be made to yield a profit to private owners. Experience has shown that where the rewards of commerce are open to all, little Government regulation is necessary. When natural or legal monopoly enters the field restrictive measures become necessary.

Our railroads show signs that they have reached a point in their development where the economic law of diminishing returns is operating to check expansion. Each gain in efficiency is now achieved with decreasing profit, and the final result must be increased freight rates, diminished efficiency, or decreased profits or some combination of these results. In any case an increase in the relative importance of waterways is foreshadowed.

COST OF ILLINOIS AND MISSISSIPPI CANAL TO JUNE 30, 1908.

Around lower rapids of Rock River—total cost.

Surveys	$22,938.92	Lock No. 36	$39,532.19
Right of way	26,851.14	Guard lock	72,696.97
Canal trunk:		Dams	35,086.13
Mile 1	24,154.91	Bridges	39,437.89
Mile 2	18,985.64	Property	32,607.30
Mile 3	18,680.01		
Miles 4 and 5	126,716.52	Total	547,229.93
Lock No. 37	89,542.31		

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Rock River Division.

Dredging Rock River	$470.21	Rock River pool	$21,500.00
Moline Highway Bridge	25,000.00		
		Total	46,970.21

Eastern section, Illinois River to Feeder Junction.

Surveys	$38,278.46	Pipe culvert 9	$1,508.01
Right of way	130,836.92	Pipe culvert 10	1,915.65
Mile 1	37,635.99	Pipe culvert 11	1,531.07
Mile 2	28,728.54	Pipe culvert 15	2,356.35
Mile 3	25,616.25	Culvert at Peoria crossing	456.83
Mile 4	54,973.43	Arch culvert 1	11,481.26
Mile 5	35,267.64	Arch culvert 2	9,590.57
Mile 6	18,967.67	Arch culvert 3	10,799.74
Mile 7	29,921.06	Arch culvert 4	16,243.12
Mile 8	34,242.93	Arch culvert 5	7,181.63
Mile 9	44,974.44	Arch culvert 6	8,154.17
Mile 10	39,665.68	Arch culvert 7	12,681.58
Mile 11	45,718.98	Arch culvert 8	10,896.74
Mile 12	34,980.99	Arch culvert 9	9,605.60
Mile 13	39,968.66	Aqueduct 1	47,944.93
Mile 14	33,440.22	Aqueduct 2	59,991.44
Mile 15	87,335.87	Aqueduct 3	52,637.98
Mile 16	87,079.21	Highway bridge, mile 5	3,182.20
Mile 17	40,097.57	Highway bridge No. 1	6,801.58
Mile 18	25,402.33	Highway bridge No. 2	5,738.56
Mile 19	66,621.85	Highway bridge No. 3	4,521.75
Mile 20	189,735.53	Highway bridge No. 4	5,390.10
Mile 21	70,329.48	Highway bridge No. 5	17,422.89
Mile 22	86,350.52	Highway bridge No. 6	12,495.84
Mile 23	29,091.86	Highway bridge No. 7	13,527.92
Mile 24	51,471.96	Highway bridge No. 8	14,709.43
Mile 25	39,842.98	Highway bridge No. 9	11,031.42
Mile 26	30,801.37	Highway bridge No. 10	16,225.83
Mile 27	24,616.80	Highway bridge No. 11	28,046.34
Mile 28	25,608.35	Highway bridge No. 12	10,856.82
Ponton bridge	2,214.25	Highway bridge No. 13	10,031.55
Lock 1	43,263.04	Highway bridge No. 14	16,690.11
Lock 2	43,598.60	Highway bridge No. 15	11,604.56
Lock 3	40,687.10	Highway bridge No. 16	15,762.50
Lock 4	39,688.37	Highway bridge No. 17	18,956.75
Lock 5	40,596.20	Highway bridge No. 18	16,327.26
Lock 6	42,944.48	New highway, mile 16	5,542.91
Lock 7	37,347.55	Railroad bridge 1	33,157.49
Lock 8	36,930.86	Railroad bridge 2	59,626.62
Lock 9	32,747.89	Railroad bridge 3	45,602.74
Lock 10	34,549.94	Farm bridge, mile 18	4,994.36
Lock 11	37,154.43	House at Lock 3	2,149.67
Lock 12	36,476.36	House at Lock 6	1,392.43
Lock 13	32,869.11	House at Lock 11	1,959.66
Lock 14	31,972.98	House at Lock 13	495.70
Lock 15	30,324.44	House at Lock 19	2,288.67
Lock 16	34,607.85	House at Lock 21	1,249.90
Lock 17	32,975.11	House on mile 24	799.47
Lock 18	35,901.29	House at Lock 5	7.44
Lock 19	34,620.29	House at Lock 7	7.44
Lock 20	38,292.39	House at Lock 8	11.28
Lock 21	39,632.51	House at Lock 9	7.44
Pipe culvert 1	3,295.57	House at Lock 10	47.28
Pipe culvert 2	201.86	House at Lock 16	12.00
Pipe culvert 3	9,243.25	House at Lock 17	12.00
Pipe culvert 4	6,062.58	House at Lock 4	107.66
Pipe culvert 5	3,436.60	House at Lock 12	33.64
Pipe culvert 6	29.54	House at Lock 20	105.38
Pipe culvert 7	3,624.44	House on mile 26	408.35
Pipe culvert 8	2,797.47	House at Lock 18	10.00

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Eastern section, Illinois River to Feeder Junction—Continued.

Cableway	$7,035.11	Lumber on hand	$3,844 29
Railroad	13,910.10	Other material on hand	4,890.94
Maintenance	62,544.75	Emergency gate, mile 23	9,383.26
Property	21,404.46		
Portland cement on hand	1,815.53	Total	3,124,847.94

Western section, Feeder Junction to Rock River.

Surveys	$19,764.09	Culvert 40	$5,108.97
Right of way	177,059.21	Culvert 41	6,213.55
Mile 28	3,308.92	Highway bridge 17A	12,864.70
Mile 29	16,417.43	Highway bridge 18A	11,482.69
Mile 30	11,687.61	Highway bridge 19	4,950.11
Mile 31	16,563.92	Highway bridge 20	14,038.57
Mile 32	13,461.48	Highway bridge 21	13,075.15
Mile 33	12,794.93	Highway bridge 22	14,486.80
Mile 34	14,917.42	Highway bridge 23	10,435.61
Mile 35	8,516.02	Highway bridge 24	12,951.55
Mile 36	8,659.99	Highway bridge 25	10,955.99
Mile 37	13,767.85	Highway bridge 26	10,654.45
Mile 38	28,419.09	Highway bridge 27	12,120.90
Mile 39	17,418.03	Highway bridge 28	12,903.87
Mile 40	16,243.78	Highway bridge 29	12,334.89
Mile 41	10,834.57	Highway bridge 30	12,009.69
Mile 42	10,996.24	Highway bridge 31	9,507.30
Mile 43	11,148.15	Highway bridge 32	10,994.63
Mile 44	11,387.63	Highway bridge 33	10,590.82
Mile 45	13,324.17	Highway bridge 34	11,057.60
Mile 46	19,954.25	Highway bridge 35	9,972.15
Mile 47	14,021.23	Highway bridge 36	3,344.30
Mile 48	18,240.98	Highway bridge 37	11,321.60
Mile 49	29,384.40	Highway bridge 38	11,422.80
Mile 50	12,000.14	Highway bridge 39	9,867.89
Mile 51	10,361.30	Highway bridge 40	4,764.81
Mile 52	10,313.89	Highway bridge 41	13,191.03
Mile 53	15,287.15	Highway bridge 42	8,122.52
Mile 54	14,028.89	Railroad bridge 4	48,812.19
Mile 55	17,257.86	Railroad bridge 5	18,703.38
Mile 56	18,365.55	Lock 22	41,863.97
Mile 57	19,555.05	Lock 23	41,356.46
Mile 58	11,486.43	Lock 24	47,034.32
Mile 59	14,962.65	Lock 25	40,479.10
Mile 60	57,265.67	Lock 26	40,404.75
Mile 61	65,785.23	Lock 27	39,077.16
Mile 62	42,472.47	Lock 28	30,786.53
Culvert 18	2,350.96	Lock 29	36,631.54
Culvert 19	2,888.35	Aqueduct 4	50,112.30
Culvert 20	6,163.96	Aqueduct 5	54,362.88
Culvert 21	10,314.16	Aqueduct 6	49,463.10
Culvert 22	3,687.12	Aqueduct 7	33,063.14
Culvert 23	5,490.28	Aqueduct 8	69,160.83
Culvert 24	10,560.20	House at Lock 22	2,195.76
Culvert 25	3,637.80	House at Lock 23	15.57
Culvert 26	5,101.43	House at Lock 24	18.03
Culvert 27	5,008.34	House at Lock 26	151.40
Culvert 28	2,273.74	House at Lock 28	2,588.58
Culvert 29	3,472.31	House at Lock 29	17.15
Culvert 30	9,609.46	House on mile 34	4.99
Culvert 31	4,657.25	House on mile 35	6.81
Culvert 32	3,147.46	House on mile 43	10.61
Culvert 33	3,481.31	House at Lock 25	2,062.58
Culvert 34	3,142.66	Maintenance	10,352.38
Culvert 35	8,344.51	Property	9,854.28
Culvert 36	10,672.66	Material on hand	693.39
Culvert 37	9,557.41	Railroad	9,117.17
Culvert 38	11,747.66		
Culvert 39	5,781.81	Total	1,927,672.50

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Feeder line.

Surveys	$28,701.85	Culvert 12	$2,846.59
Right of way	134,060.91	Culvert 13	3,472.90
Right of flowage	103,846.93	Culvert 14	2,687.05
Mile 1	76,754.87	Culvert 15	3,038.49
Mile 2	29,948.64	Culvert 16	5,503.96
Mile 3	16,803.44	Culvert 17	17,096.64
Mile 4	22,578.54	Highway bridge 43	3,758.61
Mile 5	16,419.09	Highway bridge 44	8,762.30
Mile 6	30,003.12	Highway bridge 45	14,022.99
Mile 7	31,895.56	Highway bridge 46	9,330.42
Mile 8	26,179.85	Highway bridge 47	14,051.47
Mile 9	15,798.93	Highway bridge 48	8,258.80
Mile 10	20,728.71	Highway bridge 49	10,101.52
Mile 11	31,489.43	Highway bridge 50	12,266.08
Mile 12	21,664.19	Highway bridge 51	5,564.09
Mile 13	27,782.78	Highway bridge 52	5,262.91
Mile 14	28,809.07	Highway bridge 53	5,198.41
Mile 15	26,132.34	Highway bridge 54	5,585.54
Mile 16	22,462.05	Highway bridge 55	5,521.67
Mile 17	17,078.53	Highway bridge 56	6,482.48
Mile 18	17,179.85	Highway bridge 57	5,166.73
Mile 19	18,957.94	Highway bridge 58	5,216.29
Mile 20	17,972.13	Highway bridge 59	10,512.22
Mile 21	22,075.06	Highway bridge 60	8,487.66
Mile 22	31,217.21	Highway bridge 61	11,919.19
Mile 23	28,542.61	Highway bridge 62	7,319.59
Mile 24	39,507.12	Highway bridge 63	5,820.45
Mile 25	33,502.78	Highway bridge 64	5,809.28
Mile 26	35,674.28	Railroad bridge, No. 1	31,554.71
Mile 27	13,123.16	Railroad bridge, No. 2	29,990.40
Mile 28	18,871.35	Aqueduct 9	75,219.09
Mile 29	28,952.00	Guard lock	32,712.57
Culvert 1	11,006.41	Sterling dam	91,103.47
Culvert 2	8,744.47	Guard lock house	6,617.32
Culvert 3	3,706.12	House on mile 9	442.80
Culvert 4	11,212.39	House on mile 17	36.97
Culvert 5	10,856.27	House on mile 23	26.79
Culvert 6	14,267.50	Railroad	30,898.61
Culvert 7	5,751.79	Property	6,181.22
Culvert 8	12,265.19	Material on hand	13,902.20
Culvert 9	12,137.09	Maintenance	7,948.09
Culvert 10	3,681.07	Riprap	1,913.75
Culvert 11A	5,920.14		
Culvert 11B	967.73	Total	1,672,842.81

Recapitulation.

Eastern section	$3,124,847.94
Western section:	
Around rapids of Rock River	547,229.93
Rock River Division	25,470.21
Rock River pool	21,500.00
Feeder junction to Rock River	1,927,672.50
Feeder line	1,672,842.81
Total cost	7,319,563.39

M M 4.

OPERATING AND CARE OF ILLINOIS AND MISSISSIPPI CANAL.

For the latter half of the fiscal year the canal has been operated and maintained under the indefinite appropriation of funds under the

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law of July 5, 1884, allotments aggregating $90,000 having been made for that purpose.

The preliminary work has consisted of organizing forces, patrolling banks, repairing, operating locks, rebuilding the telephone line, building barges and fitting out boats for use on the canal, and repairing breaks and weak points.

During the three months that the canal has been open to navigation this season little commerce has yet developed; it is too early to expect much traffic along this new route or to predict the amount or nature of the commerce to be developed. One company has been formed and has two steamboats and three barges doing business on the canal. The United States has used the canal for transporting its material for houses and stone for riprapping. Several leases have been made with private parties for the use of tracts on the right of way for commercial purposes.

In spite of great watchfulness several breaks in the banks have occurred, the most serious one taking place May 14th and being adjacent to the west end of aqueduct No. 3. The sudden withdrawal of water caused the banks to slough badly. The break has been repaired, but the full stage of water has not yet been turned into that level.

A large amount of work has been done in cleaning out, enlarging, and deepening seep ditches to prevent damage to adjacent lands by water escaping from the canal. Generally it may be said that the water does not escape through the banks but through the earth underneath them. A large amount of rain fell during the spring, and many of the complaints in regard to seepage were due to the excessive rainfall.

A number of icehouses were built and filled with ice. It was decided to install a new and modern telephone line along the canal; materials were purchased, a party organized, and 25 miles of the line built.

As soon as the ice melted it became evident that those portions of the banks not riprapped must receive early attention. Some stone was stored at Colona and at Rock Falls, but barges were required for moving it. After endeavoring to rent or buy barges, without success, it was decided to build new ones. The second-hand lumber on the canal, with new lumber purchased, was used and eleven barges 16 by 70 feet and one barge 20 by 44 feet were built. They were put into service as fast as built. Riprapping has been steadily progressing and the banks where wave action was greatest have been protected. It will be necessary to continue this work for some time to come.

This canal was undertaken eighteen years ago, and conditions in many respects have radically changed in that time. In its construction the original purposes of the projectors have been adhered to and the early plans followed with few alterations. What those purposes were, the circumstances surrounding the undertaking of the work, its progress and possible commerce, are referred to in the accompanying descriptive and historical sketch of the work.

PROPOSED APPLICATION OF FUNDS.

The funds to be alloted will be used for ordinary maintenance, repairing breaks, strengthening banks, repairing and maintaining structures, operating locks, maintaining boats and barges for super-

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vision and revetment, dredging and transportation of men and materials, subsistence of crews, completing and operating telephone line, purchase of miscellaneous materials and supplies, and patrolling the banks.

Summarized statement of expenditures from appropriation for operating and care of canals and other works of navigation (indefinite) applied to Illinois and Mississippi Canal.

Services	$60,004.97
Steamboats and motor skiffs, and equipping and maintaining boats	6,205.90
Building barges, material	6,395.41
Material and supplies	1,595.15
Stationery, photograph supplies, etc	159.56
Travel expense	686.50
Repairs to plant, houses, etc	1,240.85
Property	631.64
Livery	318.85
Freight	33.37
Telegrams, telephone, rent, and express	50.26
Drayage	21.70
Telephone construction	8,661.76
Total	86,005.92

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APPENDIX N N.

IMPROVEMENT OF RIVERS AND HARBORS IN THE GRAND RAPIDS, MICHIGAN, DISTRICT.

REPORT OF COL. M. B. ADAMS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. St. Joseph Harbor and River, Michigan.
2. Harbor at South Haven, Michigan.
3. Harbor at Saugatuck and Kalamazoo River, Michigan.
4. Harbor at Holland, Michigan.
5. Harbor at Grand Haven, Michigan.
6. Grand River, Michigan.
7. Muskegon Harbor, Michigan.
8. Harbors at White Lake and Pentwater, Michigan.
9. Harbor at Ludington, Michigan.
10. Harbor at Manistee, Michigan.
11. Harbor of Refuge at Portage Lake, Michigan.
12. Arcadia Harbor, Michigan.
13. Frankfort Harbor, Michigan.
14. Harbor at Charlevoix, Michigan.
15. Harbor at Petoskey, Michigan.

UNITED STATES ENGINEER OFFICE,
Grand Rapids, Mich., July 17, 1908.

SIR: I have the honor to submit herewith the annual report of works of river and harbor improvement under my charge for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

M. B. ADAMS,
Colonel, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

N N 1.

IMPROVEMENT OF ST. JOSEPH HARBOR AND RIVER, MICHIGAN.

(A) ST. JOSEPH HARBOR.

The available depths as ascertained by soundings made April 2–8, 1908, were 19 feet outside of the entrance, 18 feet for a width of 160 feet next to the north pier between the piers, 17 feet in the south draw opening of the railroad bridge and thence to the mouth of the Benton Harbor Canal, but only 15 feet in the north draw opening of

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the bridge, 10.3 feet in the part of the Benton Harbor Canal below the mouth of the Paw Paw River, and 16 feet above. The depths refer to the level of zero of gauge.

There had been previous knowledge of the deficient depth in the lower part of the Benton Harbor Canal, and bids for restoring the required depth were invited by circular letter dated March 23 and opened April 1, 1908. An emergency contract was entered into April 2 with the Fitz Simons & Connell Company, the lowest bidders, and work was begun April 29 and completed May 14, with the result of restoring a depth of 15 feet for a width of 60 feet. The quantity dredged was 11,760 cubic yards, and the cost was $2,959.11, including contingencies.

Bids for refilling with stone the outer 400 feet of the south pier were invited by circular letter dated August 14, but no bids were received. Bids were again invited by public advertisement dated December 14 and by circular letter dated June 19, but in each case only one bid was received, and the prices asked being considered exorbitant they were rejected.

The sum of $2,655.22, including contingencies, was expended during the year on dredging operations by the U. S. dredge *Gillespie* during June of previous fiscal year.

(B) ST. JOSEPH RIVER.

No work has been required on this river during the past fiscal year for the maintenance of the navigation.

ST. JOSEPH HARBOR.

Money statements.

July 1, 1907, balance unexpended	$27,543.07
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	5,614.33
July 1, 1908, balance unexpended	21,928.74
July 1, 1908, outstanding liabilities	180.00
July 1, 1908, balance available	21,748.74
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	15,000.00

ST. JOSEPH RIVER.

July 1, 1907, balance unexpended	$1,003.74
July 1, 1908, balance unexpended	1,003.74

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APPROPRIATIONS.

ST. JOSEPH HARBOR AND RIVER, MICHIGAN.

July 4, 1836		$20,000.00	
March 3, 1837		15,000.00	
July 7, 1838		51,113.00	
March 3, 1843		25,000.00	
June 11, 1844		20,000.00	
August 30, 1852		10,000.00	
June 28, 1864 (allotment)		15,000.00	
June 23, 1866		6,000.00	
March 2, 1867		23,000.00	
Alloted from harbors on Northwestern Lakes, 1867	$7,500.00		
Transferred in 1870 to Grand Haven Harbor	500.00		
		7,000.00	
July 11, 1870		15,000.00	
March 3, 1871		10,000.00	
June 10, 1872		3,000.00	
June 23, 1874		2,000.00	
March 3, 1875		35,000.00	
August 14, 1876		12,000.00	
June 18, 1878		12,000.00	
March 3, 1879			$6,000.00
June 14, 1880			8,000.00
March 3, 1881			10,000.00
August 2, 1882			12,000.00
July 5, 1884			15,000.00
August 5, 1886			10,000.00
August 11, 1888			12,000.00
September 19, 1890			20,000.00
July 13, 1892			59,000.00
August 18, 1894			30,000.00
June 3, 1896			30,000.00
March 3, 1899			50,000.00
June 6, 1900			253,950.00
March 3, 1901			38,000.00
June 13, 1902			23,250.00
March 3, 1905			15,000.00
March 2, 1907			15,000.00
Miscellaneous receipts			1,027.65
Total			889,340.65
Amount carried to surplus fund, 1856			.80
Balance			889,339.85

ST. JOSEPH RIVER, MICHIGAN.

August 11, 1888		$2,500.00	
September 19, 1890		1,000.00	
July 13, 1892 (allotment)		1,000.00	
August 18, 1894		500.00	
June 3, 1896		500.00	
June 13, 1902			$750.00
March 2, 1907			1,000.00
Total			7,250.00

CONTRACTS IN FORCE.

COAL FOR U. S. DREDGE "GILLESPIE."

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: West Virginia Crown Hill, $3.10 per ton; Youghiogheny, $3.25 per ton; Hocking Valley, $2.95 per ton; Saginaw, $3 per ton; Pittsburg, No. 8, $2.85 per ton.

Contractor: S. P. Bennett Fuel and Ice Company.
Date of contract: April 11, 1908.
Date of approval: April 23, 1908.
Date of beginning: April 23, 1908.
Date of expiration: December 31, 1908.
Rates: Youghiogheny Gas Pool 2, $3.20 per ton; West Virginia Yellow Jacket, $3.15 per ton; Hocking Valley, $2.95 per ton; Saginaw, $2.85 per ton; Pittsburg No. 8, $2.80 per ton.

EMERGENCY CONTRACT FOR DREDGING.

Contractor: The Fitz Simons & Connell Company.
Date of contract: April 2, 1908.
Date of beginning: April 11, 1908.
Date of expiration: Indefinite.
Work: Dredging for maintenance of channel, at 23 cents per cubic yard.

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COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

ST. JOSEPH HARBOR.

[Compiled from statements furnished by the deputy collectors of customs at St. Joseph and Benton Harbor, Michigan.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	1,054	806,998
Sail	26	2,956
Other craft	2	55
Total	1,082	809,979

Maximum draft: Harbor 17 feet, Benton Harbor Canal 15 feet.

Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Cedar posts	236	Barrels, empty	7
Crushed stone	3,600	Fruit	12,879
Feed	33	Gravel	780
Flour	20	Merchandise, miscellaneous	22,515
Lumber	1,490	Melons	1,089
Merchandise, miscellaneous	3,156	Paper	9
Salt	6,081	Sand	3,485
Shingles	11	Sugar	50
Sugar	2	Vegetables	69
Ties	2,030	Vinegar	456
Vinegar	80		
		Total	41,335
Total	36,709		

Total freight carried:	Tons.
1906	115,839
1907	78,044
Decrease	37,795

ST. JOSEPH RIVER.

[Data furnished by Mr. W. H. Hull, St. Joseph, Mich.]

The steamer *May Graham* carried 5,952 passengers and 355 tons of freight.

NOTE.—The steamer *Tourist*, which has previously been reported, was sold and the business done by her could not be obtained.

N N 2.

IMPROVEMENT OF SOUTH HAVEN HARBOR, MICHIGAN.

The dredging begun June 29, 1907, by the U. S. dredge *Gillespie* between the piers and on the bar was completed July 25, and resulted in reestablishing a depth of 20 feet for the full width of the entrance through the bar and 16 feet for a width of 90 feet between the piers. The quantity dredged in July was 28,893 cubic yards, and the cost was $3,897.57, including contingencies. The available depths at the opening of navigation in 1908, as shown by soundings made April 9–13, were as follows: On the outer bar, 10.5 feet on line of the north pier, 11.9 to 12.1 feet opposite the entrance, and 12.6 feet on line of

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south pier; between the piers, 13.1 feet, and in Black River 13.4 feet, but a shoal in mid-channel opposite the upper winding basin showed only 10.2 feet.

In order to restore the required depths, bids for dredging were invited by circular letter dated April 23, opened May 4, and emergency contract was awarded to the Fitz Simons & Connell Company, the lowest bidders. Work was begun May 18 and completed June 3 and resulted in providing a depth of 14 feet for a width of 60 feet in the channel in Black River. In addition a cut 30 feet wide was made through the outer bar for the purpose of enabling the U. S. dredge *Gillespie* to enter and do the required dredging on the bar and between the piers. The quantity removed under this contract was 11,826 cubic yards, and the cost was $2,320.87, including contingencies.

The dredging at the entrance and between the piers was begun by the *Gillespie* on May 26 and continued until June 6, resumed June 17, and continued until the end of the fiscal year. It will be completed during July and will provide a depth of 16 feet between the piers and 18 feet outside. The quantity removed by this dredge from May 26 to June 30 was 55,297 cubic yards, and the amount expended on this work during the year was $5,464.20, including contingencies. The depths referred to above refer to the level of zero of gauge.

Repeated efforts were made during the fiscal year to have a number of vacant portions of the piers refilled with stone, but failed because of the fact that no bids were received in one case, and the only bidders on the two other occasions asked exorbitant prices. It is hoped that better results will be attained the next time.

The expenditure during the year on dredging operations under contract with Greiling Brothers was for work done in June, 1907, and amounted to $5,013.18, including contingencies.

The balance available for this harbor is $60,706.89, which is proposed to be applied as follows:

If harbor lines are established in accordance with the new project, these funds will be applied in carrying forward the provision of law, acts of March 3, 1905, and March 2, 1907, and in maintenance.

If harbor lines are not established, a portion of these funds is expected to be expended in maintaining an 18-foot channel through the outer bar and a 16-foot channel between the piers and to maintenance of the piers, unless extension of the piers under the new project is authorized, in which case the entire available balance could be applied advantageously in one year to pier extension and maintenance.

If pier extensions are authorized or if harbor lines are established in accordance with law, $100,000 might be advantageously expended in two years' operations, and $50,000 additional funds might be appropriated for this harbor in either event.

In order to provide and properly maintain a channel 18 feet deep over the outer bar it appears necessary to extend both piers at least to the 18-foot contour, or 500 feet each; and it is therefore recommended that, in addition to maintenance of the piers by general repairs, at an estimated cost of $39,000, there be 1,000 feet of pier extension built at this harbor, at an estimated cost of $100,000, and that this be done irrespective of harbor lines being established according to law.

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Money statement.

July 1, 1907, balance unexpended	$75,925.14
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	12,798.25
July 1, 1908, balance unexpended	63,126.89
July 1, 1908, outstanding liabilities	2,420.00
July 1, 1908, balance available	60,706.89
Amount (estimated) required for completion of existing project	248,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	89,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

March 2, 1867	$43,000.00	September 19, 1890	$15,000.00
July 11, 1870	10,000.00	July 13, 1892	10,000.00
March 3, 1871	15,000.00	August 18, 1894	20,000.00
June 10, 1872	12,000.00	June 3, 1896	15,000.00
March 3, 1873	20,000.00	March 3, 1899	45,000.00
June 23, 1874	10,000.00	June 6, 1900 (allotments March 21, 1901, $1,000, and May 6, 1902, $2,300)	3,300.00
March 3, 1875	10,000.00	June 13, 1902	12,000.00
August 14, 1876	10,000.00	June 13, 1902 (allotment May 14, 1904)	5,000.00
June 18, 1878	12,000.00	March 3, 1905	50,000.00
March 3, 1879	7,500.00	March 2, 1907	40,000.00
June 14, 1880	5,000.00	Miscellaneous receipts	2,137.47
March 3, 1881	5,000.00	Total	409,437.47
August 2, 1882	10,000.00		
July 5, 1884	7,500.00		
August 5, 1886	5,000.00		
August 11, 1888	10,000.00		

CONTRACTS IN FORCE.

DREDGING.

Contractor: Greiling Brothers.
Date of contract: April 3, 1907.
Date of approval: April 15, 1907.
Date of beginning: May 2, 1907.
Date of expiration: October 2, 1907.
Work: Dredging for maintenance of channel, at 21½ cents per cubic yard.

COAL FOR U. S. DREDGE "GILLESPIE."

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: West Virginia Crown Hill, $3.10 per ton; Youghiogheny, $3.25 per ton; Hocking Valley, $2.95 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $2.85 per ton.

Contractor: S. P. Bennett Fuel & Ice Company.
Date of contract: April 11, 1908.
Date of approval: April 23, 1908.
Date of beginning: April 23, 1908.
Date of expiration: December 31, 1908.
Rates: Youghiogheny Gas Pool 2, $3.20 per ton; West Virginia Yellow Jacket, $3.15 per ton; Hocking Valley, $2.95 per ton; Saginaw, $2.85 per ton; Pittsburg No. 8, $2.80 per ton.

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EMERGENCY CONTRACT FOR DREDGING.

Contractor: The Fitz Simons & Connell Company.
Date of contract: May 6, 1908.
Date of beginning: May 16, 1908.
Date of expiration: Indefinite.
Work: Dredging for maintenance of channel, at 18 cents per cubic yard.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by the deputy collector of customs at South Haven, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	604	484,622
Sail	2	139
Other craft	3	91
Total	609	484,852

Maximum draft, 16 feet between piers; 14 feet in Black River.

Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Lumber	350	Fruit	2,244
Merchandise, unclassed	28,070	Merchandise, unclassed	10,660
Wood	159		
Total	28,579	Total	12,904

Total freight carried:	Tons.
1906	60,077
1907	41,483
Decrease	18,594

Passengers carried: Series of 1906, 279,886; series of 1907, 181,594; decrease, 98,292.

NOTE.—Decrease in number of passengers carried due mostly to taking the steamer *Eastland* away from South Haven; decrease in shipment of fruit due to the killing off of so many fruit trees by frost in October, 1906.

N N 3.

IMPROVEMENT OF HARBOR AT SAUGATUCK AND KALAMAZOO RIVER, MICHIGAN.

Under date of July 1, 1907, a contract was entered into with Robert Love for repairing the inner end of the south pier and for the construction of the revetments of the interior portion of the channel to Kalamazoo River. Operations under this contract were begun in July, continued until November 15, resumed March 25, and completed June 19, 1908. The wrecked portion of the south pier extending in the substructure from station 12+22 to 13+02 and in the superstructure from station 12+06 to 13+02, was rebuilt. The new revetments built under this contract consist of a substructure of two parallel rows of round piles, the front piles being 4 feet and the rear piles 8 feet between centers, supplemented by a wall of triple lap-

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sheet piles immediately back of the front round piles, the whole united and secured by means of front and rear wales, guide and binding timbers, and screw bolts and tie rods, and of a superstructure of 12-inch by 12-inch timbers 4 courses high in the front wall and two courses high in the rear wall, with a plank walk 3 feet wide on top. At the Kalamazoo River end each revetment is provided with a wing of construction similar to that of the main revetment, and at right angles to the latter. The alignment of the south revetment and that of 922 linear feet of the north revetment is straight and in continuation of the lines of the respective piers, but the inner 321.5 feet of the north revetment is built on a curve following the line of the bank to Kalamazoo River. The length of the part of the south revetment built under this contract is 979.5 feet, that of the north revetment 1,243.5 feet, and that of each wing on the outer face 34 feet. The total length of the south pier and revetment, without the wing, is at the present time 2,479.5, and that of the north pier and revetment 2,743.5 feet. The expenditures on account of this contract were $59,088.55, including contingencies; $56,612.44 being for construction and $2,476.11 for maintenance.

The dredging begun June 18, 1907, under the contract with Greiling Brothers for the restoration of the needed depth, was continued and finally completed September 20. It resulted in again providing a channel 90 feet wide and 15 feet deep between the piers and in the unprotected cut inside. The quantity dredged from July 1 to September 20 was 57,800 cubic yards, and the cost of the work was $10,813.01, including contingencies.

In order to further widen and deepen the new channel the U. S. dredge *Gillespie* began operations September 19, but the storms prevailing at that time swept such masses of sand around the inner end of the piers into it, that on September 25 the maximum depth between station 6 and 12 was only 12 feet, too little for the dredge to operate in and the work had to be discontinued. The quantity dredged by the *Gillespie* from September 19 to 25 was 4,127 yards, and the cost of the work was $1,163.67, including contingencies.

An examination made April 14–18, 1908, showed the following available depths: Outside, 10.4 feet opposite the entrance, 13.6 feet on the line of the north pier, and 10.7 feet on the line of the south pier; between the piers 10 feet, and in the interior channel near the inner end 15 feet. The depths stated above refer to the level of zero of gauge. Immediately upon the completion of the revetments to Kalamazoo River, bids for the dredging required to restore the proposed depth were invited by public notice circular, to be opened July 2, 1908. The sum of $78.98 was expended upon the above survey.

After two previous unsuccessful endeavors to obtain satisfactory bids for additional stone filling for the projecting piers, bids were again invited by circular letter dated June 19, opened June 29, and that of The Green Stone and Quarrying Company was accepted.

In addition to stone filling for the piers (contract awarded July 1, 1908), owing to the provision in the act of March 2, 1907, authorizing the deepening of the channel to allow the free use of the U. S. dredge *Gillespie*, it is expected to maintain a depth of 16 feet between piers and revetments and 18 feet over the bar, and in order to do this the piers should be extended to the 18-foot contour at an estimated cost of $100,000. The available balance ($2,300), after deducting cost of

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contract for dredging and stone entered into in July, 1908, will barely be sufficient to cover the cost of one short period of dredging by the United States dredge.

If pier extensions are authorized by law in accordance with recommendation, then the 1,000 feet of pier extension that should be built is estimated to cost $100,000 and there should be $5,000 made available for maintenance and $5,000 for two years' dredging operations.

Money statement.

July 1, 1907, balance unexpended		$94,184.33
Refundment of overpayment		.05
		94,184.38
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$56,612.44	
For maintenance of improvement	14,531.77	
		71,144.21
July 1, 1908, balance unexpended		23,040.17
July 1, 1908, outstanding liabilities		102.00
July 1, 1908, balance available		22,938.17
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	[a] $100,000.00	
For maintenance of improvement	10,000.00	
		110,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Date.	Saugatuck Harbor.	Kalamazoo River.	Total.
July 25, 1868 (allotment)	$23,900		$23,900.00
April 10, 1869 (allotment)	6,039		6,039.00
July 11, 1870	10,000		10,000.00
March 3, 1871	10,000		10,000.00
June 10, 1872	15,000		15,000.00
March 3, 1873	10,000		10,000.00
June 23, 1874	10,000		10,000.00
March 3, 1875	10,000		10,000.00
August 14 1876	3,000		3,000.00
June 18, 1878	2,500		2,500.00
March 3, 1879	5,000		5,000.00
June 14, 1880	5,000		5,000.00
March 3, 1881	5,000		5,000.00
August 2, 1882	8,000		8,000.00
July 5, 1884	4,000		4,000.00
August 5, 1886	8,000		8,000.00
August 11, 1888	5,000		5,000.00
July 13, 1892	5,000		5,000.00
August 18, 1894	12,000		12,000.00
June 3, 1896	10,000	$5,000	15,000.00
March 3, 1899	7,000	10,000	17,000.00
June 6, 1900 (allotments July 2, 1900, $2,500; March 21, 1901, $5,000)	7,500		7,500.00
June 13, 1902	15,000		15,000.00
June 13, 1902 (allotment May 31, 1904)	5,300		5,300.00
March 3, 1903		100,000	100,000.00
March 3, 1905	15,000	60,000	75,000.00
June 13, 1902 (allotment December 8, 1906)			4,700.00
March 3, 1905 (allotment October 22, 1906)			10,000.00
March 2, 1907			75,000.00
February 26, 1908, refundment of overpayment			.05
Total	217,239	175,000	481,939.05

[a] If authorized as recommended.

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CONTRACTS IN FORCE.

DREDGING.

Contractor: Greiling Brothers.
Date of contract: April 3, 1907.
Date of approval: April 15, 1907.
Date of beginning: May 2, 1907.
Date of expiration: August 2, 1907 (time limit waived).
Rate: 15.8 cents per cubic yard, scow measurement, and 15 cents spoil-bank measurement.
Work: Dredging for maintenance of new channel from Lake Michigan to Kalamazoo River.

CONSTRUCTION OF SHEET PILE REVETMENTS AND REPAIR OF SOUTH PIER.

Contractor: Robert Love.
Date of contract: July 1, 1907.
Date of approval: July 15, 1907.
Date of beginning: August 16, 1907.
Date of expiration: June 30, 1908.
Rates: Cutting down and removing 96 feet of old work, $2 per linear foot; oak piles, 36 cents per linear foot; oak timber, $65 per thousand; pine or Douglas fir timber, $46 per thousand; pine or Douglas fir planks for sheet piles, $49 per thousand; pine or Douglas fir plank for decking, $45 per thousand; drift bolts, screw bolts, tie rods, and spikes, 4 cents per pound; carriage bolts, 5 cents per pound.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by Mr. R. Colborn Brittain, at Saugatuck, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	284	16,546

Maximum draft, 10 feet.

Receipts and shipments by vessels, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Coal	800	Baskets	420
Lumber	2,625	Fruit	1,185
Merchandise, miscellaneous	500	Merchandise, miscellaneous	160
Total	3,925	Total	1,765

Total freight carried:	Tons.
1906	21,500
1907	5,690
Decrease	15,810

NOTE.—Mr. Brittain states that owing to small fruit crop the Dunkley Williams Company did not run a steamer direct between Saugatuck and Chicago during 1907, but transferred the same to South Haven by a small steamer, which accounts for the decrease of 15,810 tons.

N N 4.

IMPROVEMENT OF HARBOR AT HOLLAND, MICHIGAN.

Work under the continuing contract with Macdonald & Beauvais for the construction of the piers for the outer expansion basin was continued. In the north pier the remaining crib, 150 feet by 24 feet

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by 16½ feet, was sunk in its place, the six-course superstructure was completed over all the cribs, the work was filled with stone and decked over. This completes the proposed crib work for the north pier, which is 750 feet long, the outer 100 feet being 30 feet wide and the remaining 650 feet 24 feet wide. Part of the two sides and the ends of the structure have been riprapped with 325.2 cords of stone weighing not less than 500 pounds each. Commencement has been made of the construction of the pile structure to connect the inner end of the new outer portion of the north pier with the outer end of the old north pier, and 95 round piles have been driven in the rear wall and 32 piles in the front wall. In the south pier, in which one crib 100 feet long and 30 feet wide had been sunk in the previous fiscal year, the pile foundation for all the remaining cribs was prepared, the construction of all the cribs was completed, and 5 cribs, each 100 feet long and 30 feet wide, were sunk in their positions, the crib for the inner end, 100 feet by 24 feet, is to be sunk early in July, and the remaining crib, 100 feet by 30 feet, will probably be sunk in its place at the outer end of the pier before the end of that month. The first course of the superstructure has been built for a length of 416 feet, the second course for a length of 396 feet, and the third course for a length of 224 feet. Portions of the side walls have been riprapped with 366.7 cords of 500-pound stone. Operations under this contract were suspended during the winter from November 30, 1907, to March 30, 1908. The expenditures on account of this contract during the year were $55,498.86, including contingencies.

Bids for rebuilding the part of the interior north pier between stations 5+44 and 12+64.2 were opened July 26, and contract for doing the work was awarded to the Bennett-Schnorbach Company, the lowest bidders. Operations were begun July 29, suspended for the winter on December 19, and resumed April 13. The old pier structure between the mentioned stations was entirely removed. In the new substructure the piles of the rear wall have been driven for a length of 603 feet, the piles of the front wall for a length of 525 feet, and the sheet piles for a length of 359 feet; the front wale was secured in place for a length of 508 feet, the upper guide for 500 feet, the binding timber for 351 feet, the rear wale for 426 feet, and the tie-rods for 351 feet. In the superstructure 348 linear feet of the first course, 340 linear feet of the second course, 330 linear feet of the third course, and 322 linear feet of the fourth course, beginning at station 12+64.2, were built and 316 linear feet of the plank walk was secured. The fender piles from the rear wall of the adjacent old work at the west end to the projecting corner of the new work were driven. The amount expended under this contract was $16,372.41, including contingencies.

A temporary closing dam at shore line back of the north pier, intended to exclude the sea from the channel until the completion of the reconstruction of the pier, had been breached, and was repaired by day labor at a cost of $462.69.

Owing principally to the existing break in the interior north pier near shore line and to the incompleted pier extensions the channel received large accretions of sand from the shores and required repeated dredging for its maintenance. The U. S. dredge *Gillespie* was in consequence employed at this harbor from September 14 to October 1, removing 13,732 cubic yards; from December 13 to 28,

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removing 13,351 cubic yards; and again from March 18 to April 7, removing 32,122 cubic yards. The cost of this dredging was $6,970.59, including contingencies.

The available depths on June 19–20, as found by soundings made at that time, were 15.4 to 16.1 feet outside of the inner entrance, with 14.7 feet on the line of the north pier and 10.6 feet on the line of the south pier, and 14.8 feet between the piers. The stated depths refer to the stage of zero of gauge.

No offers having been received in response to circular letter dated August 14, inviting bids for refilling the outer end of the old north pier with stone, bids were again invited by public advertisement dated December 16, and contract was awarded to the Leathem & Smith Towing and Wrecking Company, the lowest bidders. The sum of $14 was expended on this contract during the year for contingencies.

By public advertisement dated April 13 bids were invited for repairing the interior south pier. They were opened May 13, and contract was entered into with the Columbian Construction Company for doing the work. The sum of $49.78 was expended on this contract during the year for contingencies.

Money statement.

July 1, 1907, balance unexpended		$252,471.22
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$55,498.86	
For maintenance of improvement	23,869.47	
		79,368.33
July 1, 1908, balance unexpended		173,102.89
July 1, 1908, outstanding liabilities		351.00
July 1, 1908, balance available		172,751.89
July 1, 1908, amount covered by uncompleted contracts		110,105.63

APPROPRIATIONS.

Black Lake:	
August 30, 1852	$8,000.00
June 23, 1866	55,615.31
March 2, 1867	51,000.00
July 11, 1870	10,000.00
March 3, 1871	10,000.00
June 10, 1872	10,000.00
March 3, 1873	12,000.00
June 23, 1874	15,000.00
March 3, 1875	15,000.00
August 14, 1876	15,000.00
June 18, 1878	10,000.00
March 3, 1879	6,000.00
June 14, 1880	6,000.00
March 3, 1882	6,000.00
August 2, 1882	10,000.00
July 5, 1884	15,000.00
August 5, 1886	5,000.00
August 11, 1888	5,000.00
September 19, 1890	10,000.00
Holland:	
July 13, 1892	5,000.00
August 18, 1894	15,000.00
Holland—Continued.	
June 3, 1896	$10,000.00
March 3, 1899	37,500.00
June 6, 1900 (allotments):	
Mar. 21, 1901. $1,000	
May 6, 1902.. 3,200	
	4,200.00
June 13, 1902	73,000.00
March 3, 1905	65,000.00
March 3, 1905 (allotment January 6, 1906)	10,000.00
June 30, 1906	70,000.00
March 2, 1907	138,452.00
March 4, 1907	40,000.00
Miscellaneous receipts	1,100.00
Total	743,867.31
Amount carried to surplus fund	1.19
Balance	743,866.12

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CONTRACTS IN FORCE.

EXTENSION OF PIERS (CONTINUING CONTRACT).

Contractors: Macdonald & Beauvais.
Date of contract: October 11, 1905.
Date of approval: October 21, 1905.
Date of beginning: April 15, 1906.
Date of expiration: December 31, 1908.
Rates: Dredging for crib foundations, 25 cents per cubic yard; foundation piles, 50 cents per linear foot; oak guard piles, 40 cents per linear foot; piles for pile structures ,50 cents per linear foot; oak timber, $50 per thousand; white, Norway, or Southern pine, or Oregon fir timber, $32.50 per thousand; hemlock timber, $23.50 per thousand; white, Norway, or Southern pine, or Oregon fir planks, $31 per thousand; drift bolts, screw bolts, tie-rods, and spikes, 3 cents per pound; stone, $6 per cord.
Supplemental contract dated March 5, 1907, provided that 6 of the cribs to be placed in the south pier shall be made 30 feet wide instead of 24 feet, and that both sides and ends of both pier extensions for their full length shall be riprapped.
Rates for extra material: Foundation piles, 50 cents per linear foot; hemlock timber, $35 per thousand; pine or Oregon fir timber, $50 per thousand; pine or Oregon fir planks for decking, $42 per thousand; drift bolts and spikes, 5 cents per pound; stone for foundation and filling, $8.50 per cord; stone for riprap, $11 per cord; extra cost of replacing 28-foot, 26-foot, and 24-foot by 34-foot, 32-foot, and 30-foot hemlock cross-ties, $6.50 per thousand; extra cost of replacing 24-foot by 30-foot pine or Oregon fir cross-ties, $12.50 per thousand.

REPAIR OF NORTH PIER.

Contractor: Bennett-Schnorbach Company.
Date of contract: August 5, 1907.
Date of approval: September 3, 1907.
Date of beginning: September 20, 1907.
Date of expiration: December 31, 1907 (time limit waived).
Rates: Dredging, 34 cents per cubic yard; oak piles, 36 cents per linear foot; oak timber, $61 per thousand; pine or Douglas fir timber, $46 per thousand; pine or Douglas fir plank for sheet piles, $54.90 per thousand; pine or Douglas fir plank for decking, $46 per thousand; drift bolts, 4 cents per pound; screw bolts, carriage bolts, tie-rods, and spikes, 5 cents per pound; stone filling, $9.50 per cord; sand filling, 80 cents per cubic yard.

STONE.

Contractor: Leathem & Smith Towing and Wrecking Company.
Date of contract: February 4, 1908.
Date of approval: February 26, 1908.
Date of beginning: Opening of navigation, 1908.
Date of expiration: September 30, 1908.
Work: Furnishing, delivering, and placing about 172 cords of 100-pound stone for filling, at $7.97 per cord.

COAL FOR U. S. DREDGE "GILLESPIE."

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: West Virginia Crown Hill, $3.20 per ton; Youghiogheny, $3.35 per ton; Hocking Valley, $3.05 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $2.95 per ton (with a reduction of 10 cents per ton after season opens and agent is there).

Contractor: S. P. Bennett Fuel and Ice Company.
Date of contract: April 11, 1908.
Date of approval: April 23, 1908.
Date of beginning: April 23, 1908.
Date of expiration: December 31, 1908.
Rates: Youghiogheny Gas Pool 2, $3.30 per ton; West Virginia Yellow Jacket, $3.25 per ton; Hocking Valley, $3.05 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $2.90 per ton.

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REPAIR OF SOUTH PIER.

Contractor: Columbian Construction Company.
Date of contract: June 15, 1908.
Date of approval: July 15, 1908.
Date of beginning: July 31, 1908.
Date of expiration: December 31, 1908.
Rates: Cutting down and removing old work, $1.50 per linear foot; oak piles, 30 cents per linear foot; oak timber, $60 per thousand; pine or Douglas fir timber, $39 per thousand; pine or Douglas fir plank for decking, $39 per thousand; driftbolts, screw bolts, tie-rods, and spikes, 4 cents per pound; stone, $8.25 per cord of 128 cubic feet.

COMMERCIAL STATISTICS CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by the Graham & Morton Line of Holland, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	691	813,4[illegible]
Sail	42	9,2[illegible]
Total	733	822,7[illegible]

Maximum draft, 14.8 feet.

Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Coal	1,111	Merchandise, miscellaneous	90,8[illegible]
Lath	160		
Lumber	2,495		
Merchandise, miscellaneous	54,364		
Salt	159		
Shingles	249		
Stone	6,909		
Timber	1,680		
Wood	14		
Total	67,141	Total	90,8[illegible]

Total freight carried:	Tons.
1906	159,9[illegible]
1907	158,0[illegible]
Decrease	1,9[illegible]

NOTE.—The Graham & Morton Line state a decrease of 3,917 tons in shipments from 1906 was due to the fact that Holland Harbor shoaled early in season, causing withdrawal of boats.

N N 5.

IMPROVEMENT OF GRAND HAVEN HARBOR, MICHIGAN.

Between September 16 and October 5 the U. S. dredge *Gillespie* removed a shoal in the river channel opposite the Grand Trunk Railway's dock and provided a depth of 18 feet. The dredged quantity was 12,790 cubic yards. The same dredge deepened the channel across the outer bar January 2–3, and removed 6,499 cubic yards. The amount expended on the above dredging was $2,301.38, including contingencies.

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Soundings made June 4–6 showed a depth of 18.7 to 20.7 feet outside of the entrance, and 20 feet for a width of 200 feet next to the south pier inside. The stated depths refer to the stage of zero of gauge.

The following repairs were made by day labor and purchased material:

Between August 11 and 28, a hole in the channel wall of the south pier at the outer end, just below water surface, was closed and the three top courses in the front wall of the south pier between stations 1+53.5 and 1+64.2 W., the front wall between stations 38+08 and 38+38 E., the cross walls at stations 38+60.3 and 38+67.3, and the plank walk between stations 7 and 8 E., and between stations 17+00 and 19+25 E. were repaired at a cost of $307.63.

Minor repairs were again begun June 22, and at the end of the month the front wall of the south pier between stations 11+11.5 and 10+95 W. and between stations 10+05.5 and 9+78 W. and the decking between stations 11+11.5 and 7+10.5 W. had been placed in good condition. No expenditures on this account to June 30 were made.

After two previous unsuccessful endeavors to obtain satisfactory bids for refilling parts of the piers with stone and for riprapping the channel face of the south pier between stations 32+50 and 36+50 E. bids were again invited by circular letter dated June 19, opened June 29, and contract for the work was awarded to The Green Stone and Quarrying Company, the lowest bidders.

By public advertisement dated June 30, 1908, bids have been invited for repairing the south pier between stations 7+07 E. and +04 W. The bids are to be opened July 14.

The United States property at the harbor has been in charge of a watchman throughout the year.

By some unaccountable oversight, no provision has ever been made specifically for the general improvement of the channels of this important harbor by dredging, and they have been allowed to depend on the projected river depth of Grand River for their betterment. Business on the harbor frontage within the city limits demands greater facilities for this commerce than can possibly be afforded by the Grand River project depth of 6 feet, but unless provision is made for the general improvement of Grand Haven Harbor by dredging to the city limits, these operations will be limited, as in the past, to dredging on the outer bar and to the vicinity of the piers.

An appropriation of $40,000 is recommended for the general improvement of Grand Haven Harbor by dredging to 16 feet in depth to the limits of the city and into Spring Lake.

In addition to the general deepening of the channels comprising the harbor of Grand Haven, within the city limits and into Spring Lake, it is also recommended that the pier extensions at this harbor in accordance with the project, 100 feet on the south pier and 150 feet on the north pier, be provided for and built at an estimated cost of $40,000.

Besides the repairs in progress, there are repairs and renewals of the piers required that are estimated will cost $168,000. Dredging operations for two years are estimated to cost $5,000 if limited to the bar and the vicinity of the piers.

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Money statement.

July 1, 1907, balance unexpended	$71,627.[illegible]
June 30, 1908, amount expended during fiscal year for maintenance of improvement	2,609.[illegible]
July 1, 1908, balance unexpended	69,018.[illegible]
July 1, 1908, outstanding liabilities	101.[illegible]
July 1, 1908, balance available	68,917.[illegible]
Amount (estimated) required for completion of existing project	40,000.[illegible]
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	[a] $80,000.00
For maintenance of improvement	150,000.00
	230,000.[illegible]
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

August 30, 1852 (mouth of Grand River)	$2,000.00	August 11, 1888	$25,000.[illegible]
June 23, 1866	65,000.00	September 19, 1890	75,000.[illegible]
March 2, 1867 (mouth of Grand River)	40,000.00	July 13, 1892	90,000.[illegible]
April 10, 1869 (allotment)	1,866.15	August 18, 1894	25,000.[illegible]
July 11, 1870	10,000.00	June 3, 1896	20,000.[illegible]
1870 (allotment)	500.00	March 3, 1899	10,000.[illegible]
March 3, 1871	6,000.00	June 13, 1902	10,000.[illegible]
June 10, 1872	15,000.00	June 13, 1902 (allotment April 27, 1904)	10,000.[illegible]
March 3, 1873	75,000.00	April 28, 1904 (allotments):	
June 23, 1874	50,000.00	May 31, 1904. $20,000.00	
August 14, 1876	15,000.00	July 9, 1904. 20,000.00	
June 18, 1878	15,000.00	Jan. 17, 1905 10,000.00	
March 3, 1879	9,000.00		50,000.[illegible]
June 14, 1880	50,000.00	March 3, 1905	30,000.[illegible]
March 3, 1881	50,000.00	March 2, 1907	50,000.[illegible]
August 2, 1882	40,000.00	Miscellaneous receipts	5,576.[illegible]
July 5, 1884	50,000.00	Total	924,943.[illegible]
August 5, 1886	30,000.00		

CONTRACTS IN FORCE.

COAL FOR U. S. DREDGE GILLESPIE.

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: West Virginia Crown Hill, $3.10 per ton; Youghiogheny, $3.25 per ton; Hocking Valley, $2.95 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $2.85 per ton.

Contractor: S. P. Bennett Fuel and Ice Company.
Date of contract: April 11, 1908.
Date of approval: April 23, 1908.
Date of commencement: April 23, 1908.
Date of expiration: December 31, 1908.
Rates: Youghiogheny Gas Pool 2, $3.20 per ton; West Virginia Yellow Jacket, $3.15 per ton; Hocking Valley, $2.95 per ton; Saginaw, $2.85 per ton; Pittsburg No. 8, $2.80 per ton.

[a] If authorized as recommended.

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COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by the collector of customs at Grand Haven, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
[illegible]	1,460	1,967,829
[illegible]	10	290
[illegible] craft	2	24
Total	1,472	1,968,143

Maximum draft, 19 feet.

Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
[illegible]	10,205	Apples	161
[illegible]	418	Asbestos fiber	3,260
[illegible]	287	Asbestos sand	120
[illegible]	8,129	Beans	181
[illegible]	2,437	Beer	207
[illegible]	19,817	Beet residue	282
[illegible]	20,480	Calfskins	342
[illegible]	49,840	Cement	1,688
[illegible]	552	China clay	3,709
[illegible]	107	Cider	103
[illegible]ay	120	Clay	329
[illegible], ore	51,542	Coal	11,871
[illegible], pig	663	Coffee	227
[illegible]ber	22,850	Copper	82
[illegible]hinery	518	Flax straw	359
[illegible]t	47,145	Flour	218
[illegible]t sprouts	621	Hemp	160
[illegible]t	5,588	Hides	1,073
[illegible]chandise, unclassed	67,715	Lumber	1,659
[illegible]dings	2,033	Merchandise, unclassed	78,610
[illegible]	19,157	Myrobolans	200
[illegible]	990	Oils	1,724
[illegible]	419	Pulp	19,296
[illegible]gar	210	Pulpwood	21,709
[illegible]at	2,294	Radiators	333
		Rails, steel	187
		Salt	3,630
		Sugar	1,909
		Tanning extract	549
		Vinegar	83
Total	334,137	Total	154,261

[illegible]tal freight carried:

	Tons.
1907	488,398
1906	414,728
Increase	73,670

N N 6.

IMPROVEMENT OF GRAND RIVER, MICHIGAN.

At the end of June, 1907, the suction dredge *Ludlow* was at work [illegible] Howlett bar, where a channel had been dredged from station 178 [illegible] 218 during June. The dredge was employed from July 1 to Octo[illegible]r 29 on the stretch of river from the Lake Shore and Michigan [illegible]outhern Railroad bridge, station 142, to Grandville, station 310, and [illegible]is, together with the dredging done in June, 1907, by the *Ludlow*

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and the dredging done in April–June, 1907, by the *Farquhar*, completed a channel 100 feet wide and 6 feet deep below low water from station 142 to station 310, a distance of about 17,300 feet, except that in a few places the material was too hard to get the full depth of 6 feet for the entire 100 feet width. The material, as a rule, was too hard for this dredge to handle to advantage and the progress was slow, but as there was little demand for dredging where the material was softer, the work was continued here. Clamshell bar was completed October 29, and the dredge moved to Clay Banks bar October 30, where a channel was completed November 5, from station 479 to 494, a distance of 1,480 feet. The dredge was then moved to Bridge street ferry, where the ferry crossing was dredged November 6 to 8 to a width of about 60 feet. This completed the work proposed for the season, and the plant was towed to Grand Haven November 8 to 9 and laid up in winter quarters. General repairs were made during the winter. May 9, 1908, the dredge left Grand Haven and dredging for the season was begun May 13 on the bar at Kirby's Bayou, mile 25.5, where a channel 100 feet wide and 6 feet deep, from station 1330 to 1362, a distance of 3,200 feet, connecting with good water both above and below, was completed May 27. This was the only bar between Bass River and Grand Haven where dredging was needed. The plant was towed May 28 to 29 to Clay Banks bar, mile 9.5, where dredging ended in November, 1907. The channel was dredged station 493 to 502, 508 to 524, 528 to 531+50, 536 to 552, and in part 556 to 558, of varying widths as needed to make a channel 100 feet wide and 6 feet deep. During the year this dredge has removed 233,792 cubic yards of sand, mud, clay, and gravel and 325 snags.

At the end of June, 1907, the dipper dredge *Farquhar* and derrick conveyor *Saginaw* were at work on cut 2, Noble bar, which had been dredged to station 100 + 85. This cut was continued to station 109 + 72, July 10, when, at the request of the Grand River Boat Line, the plant was moved to near Fulton street to widen the channel where the steamers leave their slips. Cut 3 was dredged from station — 24 + 00 to — 18 + 75, a distance of 525 feet, and cut 4, station — 23 + 75 to — 19 + 50, a distance of 425 feet, the completion of this last cut giving the channel a width of about 100 feet. August 6 work was begun at station 32 + 00, at the head of Plaster Creek bar, and continued on this bar until October 25, dredging cut 2 from station 32 to 88, a distance of 5,559 feet, parallel and adjacent to cut 1 of 1905 and 1906; cut 1, station 77 + 80 to 79 + 40, a distance of 160 feet; and cut 3, station 52 + 00 to 77 + 50, a distance of 2,609 feet, parallel and adjacent to cut 2. October 25 the plant moved to Salt Works bar, about 2,000 feet above the Lake Shore and Michigan Southern Railway bridge, and dredged a cut on the left side of the channel from station 119 + 50 to 130 + 00, a distance of 1,090 feet, through a very bad bar of bowlders. This was the most difficult dredging that has been done on the river, the bowlders being so numerous and so solidly bedded. November 9 the plant moved to Glen Creek bar and was engaged November 11 to 13 removing a ridge between the *Farquhar* dredging of April–June, 1907, and the *Ludlow* dredging of September–October, 1907, also removing some ridges left by *Ludlow*. This completed the 6-foot depth on this bar. The plant then moved to the mouth of Jenison Creek, about station 347, and removed several bowlders from mid-channel. This work,

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completed November 14, ended dredging operations for the season, and the plant was towed to Grand Haven November 15 and laid up. General repairs were made to the *Farquhar* and *Saginaw* during the winter. April 23, 1908, the *Saginaw* left Grand Haven and arrived at Lamont April 24, and the *Farquhar* left Grand Haven April 26 and arrived at Lamont April 27, where an attempt was made to pull the old bridge piles near right bank, at station 912, but it was found impossible to do so, even with the use of a jet, without dredging. After removing 8 piles and 5 snags the work was abandoned for the present and the plant towed to Jenison. April 29 to May 4 the walls on both sides of the river at station 356 + 50 were removed for a distance of about 100 feet and two adjacent dredge cuts made through the shoal to the shore lines on each side of the river for a proposed ferry. May 4 dredging was begun on Jenison bar and continued to the end of June (except May 14 to 23, when no dredging could be done on account of high water), dredging cut 1, station 340 to 356, a distance of 1,560 feet; cut 2, station 326 to 356, a distance of 2,790 feet, and cut 3, station 326 to 328 + 80, a distance of 280 feet.

During the year the *Farquhar* and *Saginaw* removed 81,926 cubic yards of material, of which 4,174 were sand, 14,242 clay, 62,922 gravel and bowlders, and 588 shale and hardpan. There were also 45 snags removed.

Cost of dredging.

	Ludlow.	Farquhar and Saginaw.
Pay roll	$5,791.53	$4,656.74
Fuel	2,430.32	1,244.62
Supplies	710.66	857.20
New orange-peel bucket	.....	1,141.39
Repairs	841.13	1,612.78
Repairs to scows and small plant	632.74	162.94
Tugs: Service, repairs, etc	1,597.61	496.66
Total	12,003.99	10,172.32
Cubic yards dredged	238,792	81,926
Cost per cubic yard.....cents..	5.13	12.42

Contraction works.—The general repairs to the pile driver, etc., used on this work were completed and the plant left Grand Haven July 8 and arrived at mile 9 July 9, where work was begun. Work was delayed June 22 to 30 by high water. The last of the fascines were used September 9, and after that the force was employed until September 14 removing the wall from stations 662 to 678, a distance of 1,580 feet, and driving piles where missing in walls which it is proposed to repair next season. The work as planned for the season was completed September 27, and the plant was towed to Grand Haven and laid up September 30.

As in the previous year, the object in view has been to repair the walls where it was expected to dredge with the *Ludlow*, as they are required to keep the dredged material from running back into the channel. Fascines and poles were purchased during the past winter and will be used during the coming low-water season to make such repairs as are needed to the walls.

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Condition of channel as reported November 15, 1907, with additions to 6-foot channel made in May and June, 1908.

PARTLY DREDGED.

	Linear feet.	Width.	Depth.
		Feet.	*Feet.*
Station −25+00 to station −23+50	150		
Station −19+50 to station +143	16,250	40–70	6
Station 192 to station 204	1,200	80–100	5
Station 310 to station 322	1,200		5.5
Station 322 to station 356	3,400		4.5–5
Station 380 to station 385	500	50–100	6
Station 460 to station 466	600		5–6
Station 549 to station 552	300	30–80	6
Station 638 to station 654	1,600		4–6
Station 678 to station 708	3,000		5–6
Station 820 to station 824	400	50–70	6
Total	28,600		

COMPLETED—100 FEET WIDE AND 6 FEET DEEP.

	Linear feet.
Station −23+50 to station −19+50	400
Station 143 to station 192	4,900
Station 204 to station 310	10,600
Station 356 to station 380	2,400
Station 385 to station 460	7,500
Station 466 to station 549	8,300
Station 552 to station 638	8,600
Station 654 to station 678	2,400
Station 708 to station 820	11,200
Station 824 to station 1214	39,000
Total	95,300

Amounts expended during the fiscal year.

	Construction.	Maintenance.	Total.
Dredging	$20,365.81	$1,810.50	$22,176.31
Contraction works	81.50	5,127.09	5,208.59
Surveys	770.90		770.90
Superintendence, inspection, and contingencies	2,540.45	847.00	3,387.45
Total	23,758.66	7,784.59	31,543.25

The two steamers of the Grand Rapids and Lake Michigan Transportation Company made their last regular trip September 3, 1907, and then were tied up at their landing in Grand Rapids until October 8–9, when they were run to Spring Lake and laid up for the winter. In the spring they were sold and have been taken to the west side of Lake Michigan, after having been operated between Grand Rapids and Grand Haven for two seasons, viz, May to October 6, 1906, and May to September 3, 1907. The Grand Rapids and Lake Michigan Transportation Company was organized by those who in the past have urged the advisability and necessity of water transportation on Grand River and who have been influential in having appropriations made for the same. The boats kept a fairly good schedule during both seasons, one leaving Grand Haven after the arrival of the Chicago boat in the morning and arriving at Grand Rapids about noon, and the other leaving Grand Rapids at noon and

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connecting with the night boat for Chicago at Grand Haven. Little attempt was ever made to serve the interests along the river between Grand Rapids and Grand Haven, the methods employed by the management plainly tending, on the contrary, to discourage local business, the effort evidently being to carry through freight, possibly with the purpose in view of affecting railroad rates. And it seems probable that of the freight carried the greater part might be termed complimentary freight, which if left to itself would have followed the more convenient, if a trifle more expensive, railroad routes. And so, at the present time, while the channel is in much better condition than it was a year ago and in a very much better condition than it was two years ago, it is being used, in the upper 23 miles of its length, only for the service of gasoline launch pleasure boats.

Money statement.

July 1, 1907, balance unexpended		$99,867.89
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$23,758.66	
For maintenance of improvement	7,784.59	
		31,543.25
July 1, 1908, balance unexpended		68,324.64
July 1, 1908, outstanding liabilities		3,039.00
July 1, 1908, balance available		65,285.64
Amount (estimated) required for completion of existing project		149,000.00

APPROPRIATIONS.

March 3, 1881	$10,000.00	March 3, 1905	$100,000.00
August 2, 1882	15,000.00	March 2, 1907	88,000.00
July 5, 1884	25,000.00	Miscellaneous receipts	376.15
June 3, 1896	50,000.00		
March 3, 1899	75,000.00	Total	513,376.15
June 13, 1902	150,000.00		

CONTRACTS IN FORCE.

COAL FOR UNITED STATES GRAND RIVER DREDGES.

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: F. o. b. Government scow at Grand Rapids, West Virginia Crown Hill, $3.55 per ton; Youghiogheny, $3.55 per ton; Hocking Valley, $3.40 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $3.10 per ton.
Rates: F. o. b. Government scow at landing at Grandville, Mich., West Virginia Crown Hill, $3.55 per ton; Youghiogheny, $3.55 per ton: Hocking Valley, $3.40 per ton; Saginaw, $3.25 per ton; Pittsburg No. 8, $3.15 per ton.

Contractor: S. P. Bennett Fuel and Ice Company.
Date of contract: April 11, 1908.
Date of approval: April 23, 1908.
Date of beginning: April 23, 1908.
Date of expiration: December 31, 1908.

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Rates: F. o. b. Government scow at Grand Rapids, Youghiogheny Gas Pool 2, $3.50 per ton; West Virginia Yellow Jacket, $3.45 per ton; Hocking Valley, $3.25 per ton; Saginaw, $3.10 per ton; Pittsburg No. 8, $3.15 per ton.

Rates: F. o. b. Government scow at landing at Grandville, Mich., Youghiogheny Gas Pool 2, $3.60 per ton; West Virginia Yellow Jacket, $3.55 per ton; Hocking Valley, $3.35 per ton; Saginaw, $3.20 per ton; Pittsburg No. 8, $3.25 per ton.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statements furnished by Mr. L. W. Goddard, assistant engineer, Grand Haven, Mich., and the Grand Rapids and Lake Michigan Transportation Company, of Grand Rapids, Mich.]

Freight carried on Grand River, 1907.

	Tons.
Baskets	20
Berry crates and fillers	18
Gravel	21,658
Iron ore [a]	57,841
Logs	5,100
Merchandise, miscellaneous	3,561
Piles	120
Wood	335
Total	88,653
Total freight carried:	
1906	110,395
1907	88,653
Decrease	21,742

The Grand Rapids and Lake Michigan Transportation Company carried approximately 9,500 passengers during the year.

N N 7.

IMPROVEMENT OF MUSKEGON HARBOR, MICHIGAN.

Contractor Robert Love completed the construction of 2,000 linear feet of the new north pier and revetment on July 6, 1907. The work done by him after the beginning of the fiscal year was the securing of 1,198.2 linear feet of lower guide, placing the tie-rods in 128 linear feet of the revetment, building 142 linear feet of the first course of superstructure, 160 linear feet of the second course, 182 linear feet of the third course, and 200 linear feet of the fourth course, and the placing of 1,180 linear feet of plank walk. The expenditures during the year on account of this contract were $15,079.04, including contingencies, $8,085.68 being for construction and $6,993.36 for maintenance.

On July 6, 1907, Contractor Nelson J. Gaylord began operations on the repairs of the south pier between stations 0 and 6+30 W., prosecuted the same until November 30, resumed them May 11, and finally completed the work June 30, 1908. The repairs consisted in cutting down the old work to the level of zero of gauge, driving new front piles between stations 3+68 and 3+87.5, and new rear piles between stations 3+51.5 and 3+68.5 and between stations 4+04 and 4+64 to straighten the alignment of the work, repairing the sheet piling between stations 4+48 and 6+02, securing a new front wale from station 0 to 3+41 and new tie-rods throughout the entire

[a] To Fruitport, Mich.

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length of the work, building a new superstructure 5 courses high from station 0 to 3+70.5 and 6 courses high from station 3+70.5 to 6+30, refilling the work with stone, securing the decking throughout, and riprapping the front of the structure with 174.13 cords of 500-pound stone. The amount expended on this contract during the year was $15,312.72, including contingencies.

The east end of the south revetment, which began to incline toward the channel, was strengthened with 33 piles driven along the rear wall between stations 32+22 and 34+83 and secured to the superstructure by screw bolts. This work was done under a special agreement with A. J. Beauvais, at a cost of $610.08.

The channel at shore line was dredged by the U. S. dredge *Gillespie* between January 8 and 22, and a depth of 18 feet was restored for the time being, and between May 21 and 25 the same dredge deepened the crossing of the outer bar. The total quantity dredged on the two occasions was 15,328 cubic yards and the cost was $2,409.38, including contingencies.

By soundings made May 27 to June 1 the available depths were found to be: On the outside, 19 feet on line of north pier, 18.6 feet to 20.6 feet in front of the entrance, and 21 feet on line of south pier; between the piers, 16.5 feet.

Under date of December 10, 1907, a contract was entered into with Greiling Brothers for dredging to widen the harbor to the face of the already constructed portion of the new north revetment, and operations under this contract were begun May 4, 1908. Up to the end of the fiscal year about 2,000 linear feet of a cut 30 feet wide and 20 feet deep had been made along the line of the old pier and revetment, and parts of four other cuts, each 25 feet wide and 15 feet deep, between the first cut and the new revetment, aggregating in length 3,690 feet, had been made. The total quantity of material removed from these cuts was 88,461 cubic yards. The amount expended during the year on account of this contract was $4,998.48, including contingencies.

The depths stated above refer to the stage of zero of gauge.

A new contract, dated February 17, with Burk, Smith & Nelson, provides for the construction of 1,200 additional linear feet of north revetment. Nothing but some preliminary work has as yet been done under this contract. The sum of $141.08 was expended during the year for engineering contingencies.

Money statement.

July 1, 1907, balance unexpended		$128,787.43
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$13,225.24	
For maintenance of improvement	25,325.54	
		88,550.78
July 1, 1908, balance unexpended		90,236.65
July 1, 1908, outstanding liabilities		665.00
July 1, 1908, balance available		89,571.65
July 1, 1908, amount covered by uncompleted contracts		59,508.16
Amount (estimated) required for completion of existing project		154,750.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908		154,750.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

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APPROPRIATIONS.

March 2, 1867	$59,000	September 19, 1890	$50,000
July 11, 1870	10,000	July 13, 1892	75,000
March 3, 1871	15,000	August 18, 1894	30,000
June 10, 1872	10,000	June 3, 1896	30,000
June 23, 1874	10,000	March 3, 1899	60,000
March 3, 1875	25,000	June 6, 1900 (allotments March 21, 1901, $2,500; May 6, 1902, $3,000)	5,500
August 14, 1876	15,000	June 13, 1902	75,000
March 3, 1879	5,000	March 3, 1905	100,000
June 14, 1880	7,500	March 2, 1907	75,000
March 3, 1881	20,000	Miscellaneous receipts	110
August 2, 1882	25,000		
July 5, 1884	20,000	Total	779,610
August 5, 1886	12,500		
August 11, 1888	45,000		

CONTRACTS IN FORCE.

CONSTRUCTION AND REPAIR OF PIERS.

Contractor: Robert Love.
Date of contract: October 25, 1905.
Date of approval: November 6, 1905.
Date of beginning: May 1, 1906.
Date of expiration: December 1, 1906. (Time limit waived.)
Rates: Removing about 328 linear feet of crib work in north pier, and restoring the cribs in their new position, lump sum of $6,500; dredging for crib foundations, 20 cents per cubic yard; foundation piles, 50 cents per linear foot; oak piles, 27 cents per linear foot; oak timber, $50 per thousand; pine or Douglas fir timber, $32.75 per thousand; pine or Douglas fir plank for sheet piles, $38.75 per thousand; pine or Douglas fir plank decking, $28.50 per thousand; driftbolts, screw bolts, carriage bolts, tie-rods, and spikes, 3½ cents per pound; stone, $6.25 per cord; sand filling, 25 cents per cubic yard.

REPAIR OF SOUTH PIER.

Contractor: Nelson J. Gaylord.
Date of contract: April 17, 1907.
Date of approval: May 10, 1907.
Date of beginning: May 30, 1907.
Date of expiration: December 1, 1907. (Time limit waived.)
Rates: Cutting down and removing old work, $2.75 per linear foot; oak piles, 40 cents per linear foot; oak timber, $50 per thousand; pine or Douglas fir timber, $42.50 per thousand; pine or Douglas fir plank for sheet piles, $50 per thousand; pine or Douglas fir plank for decking, $40 per thousand; driftbolts, screw bolts, tie-rods, and spikes, 4 cents per pound; carriage bolts, 8 cents per pound; stone for riprap, $12 per cord; stone for filling, $7.50 per cord.

COAL FOR U. S. DREDGE "GILLESPIE."

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: West Virginia Crown Hill, $3.10 per ton; Youghiogheny, $3.25 per ton; Hocking Valley, $2.95 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $2.85 per ton.

Contractor: S. P. Bennett Fuel and Ice Company.
Date of contract: April 11, 1908.
Date of approval: April 23, 1908.
Date of beginning: April 23, 1908.
Date of expiration: December 31, 1908.
Rates: Youghiogheny Gas Pool 2, $3.20 per ton; West Virginia Yellow Jacket, $3.15 per ton; Hocking Valley, $2.95 per ton; Saginaw, $2.85 per ton; Pittsburg No. 8, $2.80 per ton.

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DREDGING.

Contractor: Greiling Brothers.
Date of contract: December 10, 1907.
Date of approval: December 28, 1907.
Date of beginning: May 1, 1908.
Date of expiration: September 1, 1908.
Rate: 17¾ cents per cubic yard, measured on or in scows or bins.
Work: Dredging for widening harbor to face of the new north pier and revetment; approximate 155,000 cubic yards.

CONSTRUCTION OF SHEET-PILE REVETMENT.

Contractor: Burk, Smith & Nelson.
Date of contract: February 17, 1908.
Date of approval: March 4, 1908.
Date of beginning: May 1, 1908.
Date of expiration: September 30, 1908.
Rates: Oak piles, 33 cents per linear foot; oak timber, $60 per thousand; pine or Douglas fir timber; $43 per thousand; pine or Douglas fir planks for sheet piles, $45 per thousand; pine or Douglas fir planks for decking, $42 per thousand; driftbolts, screw bolts, tie-rods, carriage bolts, and spikes, 4 cents per pound.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by the deputy collector of customs at Muskegon, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	702	516,844
Sail	118	15,963
Total	820	532,807

Maximum draft, 16.5 feet.

Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Coal	2,290	Lumber	17,964
Lath	852	Merchandise, miscellaneous	16,755
Logs	1,680	Sawdust	75
Lumber	23,284	Slabs	1,532
Merchandise, miscellaneous	16,866	Wood	187
Pickets	3,706		
Pulp wood	264		
Scrap iron	100		
Slabs	899		
Stone	13,800		
Total	63,681	Total	36,513

Total freight carried:	Tons.
1906	136,340
1907	120,194
Decrease	16,146

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N N 8.

IMPROVEMENT OF HARBORS AT WHITE LAKE AND PENTWATER, MICHIGAN.

(A) WHITE LAKE HARBOR.

The channel between the piers and through the outer bar was dredged July 26 to August 19, 1907, by the U. S. dredge *Gillespie*, and a depth of 15 feet between the piers and of 20 feet on the bar was secured for the time being. The dredged quantity was 37,102 cubic yards.

An examination of the channel made April 20 to 22, 1908, showed depths as follows: On the outside, 9.8 feet on the line of the north pier, 10 to 11 feet immediately opposite the entrance, and 15.3 feet on the line of the south pier; between the piers there was an available depth of 15 feet for a width of 50 feet next to the south pier at the outer end, and thence 15 feet in mid-channel to White Lake.

The harbor was again dredged by the U. S. dredge *Gillespie* May 2 to 20, and the resulting depths were 16 to 17 feet between the piers, and 18 to 20 on the outer bar. The quantity dredged at this time was 31,771 cubic yards.

The cost of the dredging operations during the year was $6,817.14, including contingencies.

Bids for refilling parts of the piers with stone were invited by circular letter dated August 14, and again by public advertisement dated December 16, but only one exorbitant bid was received, and it was rejected. A renewed trial by circular letter dated June 19 resulted in the receipt of a satisfactory bid by the Leathem & Smith Towing and Wrecking Company, and this was accepted.

In order to properly maintain a channel 16 feet deep between the piers and 18 feet deep through the outer bar, both piers should be extended to the 18-foot contour, at an estimated cost of $70,000 for 300 feet south pier and 400 feet north pier extension. This would be 550 feet in extension of the existing project, which contemplates 50 and 100 feet extension to the piers.

(B) PENTWATER HARBOR.

This harbor was dredged three times during the fiscal year by the U. S. dredge *Gillespie*. First between August 21 and September 13, when a quantity of 30,821 cubic yards was removed, with a resulting depth of 16 feet between the piers and 20 feet on the outer bar. These depths remained available only for a very short time, however, and on November 21 only 12 feet was found on the bar. By dredging from the latter date to December 12 a depth of 15 feet was again made available, the dredged quantity at this time being 18,278 cubic yards. On April 17 dredging was again begun and completed May 1, resulting in the removal of 17,255 cubic yards.

The cost of the above dredging was $8,000.65, including contingencies.

On May 23 to 25, 1908, when soundings were made, the following depths were found: In the outer approach 15.8 feet on the line of the north pier, 16 to 14.6 feet in front of the entrance, and 11.4 feet

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on the line of the south pier; between the piers 15 feet for a width of 40 feet in mid-channel.

The depths stated above refer to the stage of zero of gauge.

The same necessity for pier extensions at Pentwater exists as at White Lake, and for the same reasons there should be 700 feet added to the piers here, in order to reach the 18-foot contour, at an estimated cost of $70,000; but as the existing project contemplates 200 feet south pier extension and 50 feet north pier extension there would only be 450 linear feet added to the existing project.

There are 825 feet of the south pier and 100 feet of the north pier that are much in need of repairs, at an estimated cost of $29,000, and stone filling to other portions of the piers is required, at an estimated cost of $5,000.

What is stated regarding the difficulty of maintaining a 16-foot channel depth at White Lake unless the piers are extended and repaired is also true of Pentwater Harbor.

Money statements.

WHITE LAKE.

July 1, 1907, balance unexpended		$14,386.15
June 30, 1908, amount expended during fiscal year for maintenance of improvement		6,817.14
July 1, 1908, balance unexpended		7,569.01
July 1, 1908, outstanding liabilities		497.00
July 1, 1908, balance available		7,072.01
Amount (estimated) required for completion of existing project		21,720.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	[a]$70,000.00	
For maintenance of improvement	72,000.00	
		142,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

PENTWATER.

July 1, 1907, balance unexpended		$11,355.96
June 30, 1908, amount expended during fiscal year for maintenance of improvement		8,000.65
July 1, 1908, balance unexpended		3,355.31
Amount (estimated) required for completion of existing project		26,400.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	[a]$70,000.00	
For maintenance of improvement	39,000.00	
		109,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

[a] If authorized as recommended.

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APPROPRIATIONS.

Date.	Pentwater.	White Lake.	Total.
March 2, 1867	$55,000	$57,000.00	$112,000.00
April 10, 1869 (allotment)	17,820	44,550.00	62,370.00
July 11, 1870	10,000	20,000.00	30,000.00
March 3, 1871	10,000	20,000.00	30,000.00
June 10, 1872	30,000	10,000.00	40,000.00
March 3, 1873	20,000	7,000.00	27,000.00
June 23, 1874		10,000.00	10,000.00
March 3, 1875		10,000.00	10,000.00
August 14, 1876	10,000	5,000.00	15,000.00
June 18, 1878	10,000	12,000.00	22,000.00
March 3, 1879	6,000	7,500.00	13,500.00
June 14, 1880	4,000	5,000.00	9,000.00
March 3, 1881	10,000	7,500.00	17,500.00
August 2, 1882	10,000	12,000.00	22,000.00
July 5, 1884	15,000	10,000.00	25,000.00
August 5, 1886	10,000	10,000.00	20,000.00
August 11, 1888	8,000	10,000.00	18,000.00
September 19, 1890	8,000	17,000.00	25,000.00
July 13, 1892	5,000	5,000.00	10,000.00
August 18, 1894	5,000	5,000.00	10,000.00
June 3, 1896	5,000	5,000.00	10,000.00
March 3, 1899	25,000	35,000.00	60,000.00
June 13, 1902	20,000	15,000.00	35,000.00
March 3, 1905	12,000	8,000.00	20,000.00
March 2, 1907	10,000	10,000.00	20,000.00
Miscellaneous receipts		1.39	1.39
Total	$315,820	$357,551.39	$673,371.39

CONTRACT IN FORCE.

DREDGING HARBOR AT WHITE LAKE, MICH.

Contractor: Greiling Brothers.
Date of contract: April 3, 1907.
Date of approval: April 15, 1907.
Date of beginning: May 2, 1907.
Date of expiration: October 2, 1907.
Work: Dredging for maintenance of channel, at 21½ cents per cubic yard.

COMMERCIAL STATISTICS CALENDAR YEAR ENDING DECEMBER 31, 1907.

FOR WHITE LAKE HARBOR.

[Compiled from statement furnished by Goodrich Transit Company, Chicago, Ill., and the village president at Whitehall, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	191	136,866

Maximum draft, 16 feet.

Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Merchandise, miscellaneous	2,096	Merchandise, miscellaneous	2,034

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Total freight carried:	Tons.
1907	4,130
1906	400
Increase	3,730

PENTWATER HARBOR.

[Compiled from statement furnished by the village president at Pentwater, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	2,916	527,078
Sail	43	2,277
Total	2,959	529,355

Maximum draft, 15 feet.

Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Canned goods	150	Canned goods	507
Lumber	400	Peaches	400
Merchandise, miscellaneous	325	Potatoes	750
Total	875	Total	1,657

Total freight carried:	Tons.
1906	13,413
1907	2,532
Decrease	10,881

N N 9.

IMPROVEMENT OF LUDINGTON HARBOR, MICHIGAN.

Bids for the construction of the proposed breakwaters were invited by public advertisement dated October 21, 1907, opened November 20, and a continuing contract for doing the work was entered into December 10, 1907, with L. E. Schnorbach Company, the lowest bidders. Operations were begun early in May, and at the end of the fiscal year two cribs, each 100 by 30 by 26½ feet, and one crib 100 by 30 by 24½ feet, intended to be sunk at the outer end of the south breakwater, had been constructed, and the required 84 foundation piles for the outermost crib and 63 of those for the second crib had been driven. The sum of $866.94 was expended on this contract during the year for contingencies.

Between November 5 and 20 the channel between the piers and outside of the entrance was dredged by the U. S. dredge *Gillespie*, and the resulting depths were 20 to 23 feet outside and 20 feet for a width of 150 feet between the piers. The dredged quantity was 24,173 cubic yards, and the cost $2,802.69, including contingencies.

The present available depths are indicated by soundings made May 20 to 21, as follows: 21.8 feet in front of the entrance, with 19.5 feet on the prolongation of either pier, and 20 feet for a width of 40 feet in mid-channel between the piers.

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The stated depths refer to the stage of zero of gauge.

On October 2, 1907, the chooner *Golden Age*, in tow of the steamer *William Edwards*, collided with the inner end of the north pier, destroying the end wall and part of the rear wall and of the superstructure. An estimate for repairing the damage was transmitted on January 13, 1908, to the United States district attorney, for collection, and bids for the required repairs were invited by circular letter dated February 20, opened March 6, and emergency contract for doing the work was awarded to Nelson J. Gaylord, the lowest bidder. No work has as yet been done under this contract. The sum of $5.93 was expended on this contract during the year for contingencies.

Bids for refilling parts of the piers with stone were invited by circular letter of August 14, by public advertisement dated December 16, and again by circular letter dated June 19. Only the last resulted in the receipt of a satisfactory bid, viz, that of the Bennett-Schnorbach Company, and this was accepted.

Money statement.

July 1, 1907, balance unexpended		$145,407.23
Amount appropriated by sundry civil act approved May 27, 1908		20,000.00
		165,407.23
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$866.94	
For maintenance of improvement	2,808.62	
		3,675.56
July 1, 1908, balance unexpended		161,731.67
July 1, 1908, outstanding liabilities		233.00
July 1, 1908, balance available		161,498.67
July 1, 1908, amount covered by uncompleted contracts		142,496.64
Amount (estimated) required for completion of existing project		719,087.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$200,000	
For maintenance of improvement	8,000	
		208,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

March 2, 1867	$50,000.00	July 13, 1892	$5,000.00
April 10, 1869 (allotment)	31,185.00	August 18, 1894	6,000.00
July 11, 1870	10,000.00	June 3, 1896	25,000.00
March 3, 1871	10,000.00	March 3, 1899	25,000.00
June 10, 1872	10,000.00	June 13, 1902	75,000.00
March 3, 1873	25,000.00	March 3, 1903	165,000.00
June 23, 1874	20,000.00	March 3, 1905	10,000.00
March 3, 1875	10,000.00	March 2, 1907	100,000.00
August 14, 1876	10,000.00	May 27, 1908	20,000.00
June 18, 1878	15,000.00	Miscellaneous receipts	.42
March 3, 1879	5,000.00		
June 14, 1880	8,000.00	Total	783,435.42
March 3, 1881	10,000.00	Amount carried to surplus fund, 1872	.90
August 3, 1882	12,000.00		
July 5, 1884	10,000.00	Balance	783,434.52
August 5, 1886	56,250.00		
August 11, 1888	60,000.00		

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CONTRACTS IN FORCE.

COAL FOR U. S. DREDGE "GILLESPIE."

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: West Virginia Crown Hill, $3.45 per ton; Youghiogheny, $3.45 per ton; Hocking Valley, $3.20 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $3.05 per ton.

Contractor: S. P. Bennett Fuel and Ice Company.
Date of contract: April 11, 1908.
Date of approval: April 23, 1908.
Date of beginning: April 23, 1908.
Date of expiration: December 31, 1908.
Rates: Youghiogheny Gas Pool 2, $3.40 per ton; West Virginia Yellow Jacket, $3.35 per ton; Hocking Valley, $3.15 per ton; Saginaw, $2.90 per ton; Pittsburg No. 8, $3 per ton.

CONSTRUCTION OF BREAKWATERS, CONSISTING OF CRIB WORK. (CONTINUING CONTRACT.)

Contractor: L. E. Schnorbach & Co.
Date of contract: December 10, 1907.
Date of approval: December 26, 1907.
Date of beginning: April 15, 1908.
Date of expiration: Indefinite.
Rates: Dredging for crib foundations, 50 cents per cubic yard, place measurement; foundation piles, 75 cents per linear foot; oak guard piles, 40 cents per linear foot; oak timber, $60 per thousand; white, Norway, or southern pine or Douglas fir timber, $45 per thousand; hemlock timber, $30.20 per thousand; white, Norway, or southern pine or Douglas fir planks for decking, $45 per thousand; driftbolts and screw bolts, 4 cents per pound; spikes, 5 cents per pound; stone weighing 50 to 100 pounds each, $1.59 per ton of 2,000 pounds; stone weighing 500 pounds or more each, $1.89 per ton of 2,000 pounds.

EMERGENCY CONTRACT FOR REPAIRING INNER END OF NORTH PIER.

Contractor: Nelson J. Gaylord.
Date of contract: March 16, 1908.
Date of beginning: May 1, 1908.
Date of expiration: June 30, 1908. (Time limit waived.)
Rates: Cutting down and removing old work, 99 cents per linear foot; oak piles, 45 cents per linear foot; pine or Douglas fir timber, $45 per thousand; pine or Douglas fir plank for sheet piles, $50 per thousand; pine or Douglas fir plank for decking, $40 per thousand; driftbolts, 4 cents per pound; screw bolts, carriage bolts, tie-rods, and spikes, 5 cents per pound.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by the deputy collector of customs at Ludington, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	3,155	4,521,472
Sail	106	24,260
Total	3,261	4,545,732

Maximum draft, 20 feet.

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Receipts and shipments by vessels, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Beer	4,290	Bark	52
Bran	1,505	Burlap	642
Cement	15	Cedar posts	220
Coal	16,630	Cement	6,625
Copper	7,476	Coal	317,946
Corn	34,785	Fruit	862
Feed	1,785	Grain	1,090
Flour	38,972	Granite	30
Grain	218,041	Iron	38,443
Hay	514	Lumber	58,340
Iron	16,956	Merchandise, miscellaneous	226,419
Lumber	180,250	Middlings	18
Malt	13,097	Oil	12
Merchandise, miscellaneous	210,706	Plaster	1,608
Potatoes	5	Potatoes	6,565
Stone	1,918	Salt	145,122
		Shingles	175
		Soda ash	280
		Straw	220
		Sugar	2,880
		Wood	11,220
Total	746,945	Total	823,775

Total freight carried:	Tons.
1907	1,570,720
1906	1,497,424
Increase	73,296

N N 10.

IMPROVEMENT OF MANISTEE HARBOR, MICHIGAN.

Between August 5 and September 6, 1907, the channel in the river between stations 0 and 15 + 90 was widened on the south side by a dredge cut 30 feet wide and 18 feet deep under contract with Greiling Brothers. The dredged quantity was 25,560 cubic yards, and the cost of the work was $6,417.77, including contingencies.

Soundings of April 24 to 30 showed the following available depths: In the outer approach to the harbor, 18.3 feet on line of north pier, 18.7 to 17.7 feet opposite the entrance, and 17.3 feet on line of south pier; between the piers 19.3 feet at outer end and 16.3 feet at shore line, and in the river 16 feet in channel of best water.

Under a new contract the dredge of Greiling Brothers began work June 22, 1908, to widen the river channel on the north side between stations 36 and 51 by a cut 25 feet wide and 18 feet deep. At the end of the fiscal year 740 linear feet of this cut had been completed. The dredged quantity was 6,960 cubic yards. The expenditures during the year on account of this contract were $173.51 for engineering contingencies.

During the progress of this dredging the local authorities called attention to the fact that the water main and electric cables crossing the proposed cut at about station 48 are only 13.5 feet below the level of zero of gauge, which makes it impossible to dredge at this place. Upon representation from this office arrangements are understood to have been made by the local authorities to lower those objects below

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the level of prospective future dredging. The stated depths refer to the stage of zero of gauge.

The following repairs were made by day labor and purchased material during the months of October and November, 1907: The outer end of the superstructure of the north pier, which had been run into and damaged by the steam barge *John Schroeder* on December 12, 1906, as mentioned on page 1977 of Annual Report of the Chief of Engineers, U. S. Army, for 1907, was repaired and strengthened to prevent a further extension of the damage. In addition the top course of the front wall of the north pier in several places for a total length of 165 feet, the decking of the north pier in a number of places, the top course of the front wall of the south pier between stations 5 + 30 and 5 + 80, and the flooring of the boat slide through the south pier between stations 0 + 30 and 0 + 40 were repaired. The cost of these repairs were $552.07.

An invitation for bids for refilling parts of the piers with stone by circular letter dated August 14 met with no response, and a renewed invitation by public advertisement dated December 16 only with an unacceptable bid. A repeated endeavor by circular letter dated June 19 resulted in the receipt of several bids, of which the lowest, that of the Bennett-Schnorbach Company, was accepted.

Money statement.

July 1, 1907, balance unexpended		$36,692.62
June 30, 1908, amount expended during fiscal year for maintenance of improvement		7,143.35
July 1, 1908, balance unexpended		29,549.27
July 1, 1908, outstanding liabilities		40.00
July 1, 1908, balance available		29,509.27
July 1, 1908, amount covered by uncompleted contracts		5,000.00
Amount (estimated) required for completion of existing project		122,488.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$12,000.00	
For maintenance of improvement	5,000.00	
		17,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

March 2, 1867	$60,000.00	August 5, 1886	$10,000.00
July 11, 1870	20,000.00	August 11, 1888	10,000.00
March 3, 1871	9,000.00	September 19, 1890	50,000.00
June 10, 1872	10,000.00	July 13, 1892	50,000.00
March 3, 1873	10,000.00	August 18, 1894	12,000.00
June 23, 1874	10,000.00	June 3, 1896	15,000.00
March 3, 1875	25,000.00	March 3, 1899	20,000.00
August 14, 1876	14,000.00	June 13, 1902	42,000.00
June 18, 1878	15,000.00	March 3, 1905	10,000.00
March 3, 1879	10,000.00	March 2, 1907	25,000.00
June 14, 1880	10,000.00	Miscellaneous receipts	24.87
March 3, 1881	10,000.00		
August 22, 1882	15,000.00	Total	472,024.87
July 5, 1884	10,000.00		

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CONTRACTS IN FORCE.

DREDGING.

Contractor: Greiling Brothers.
Date of contract: April 3, 1907.
Date of approval: April 15, 1907.
Date of beginning: May 2, 1907.
Date of expiration: October 2, 1907.
Work: Dredging for maintenance of channel, at 21½ cents per cubic yard.

Contractor: Greiling Brothers.
Date of contract: May 8, 1908.
Date of approval: May 22, 1908.
Date of beginning: June 9, 1908.
Date of expiration: October 9, 1908.
Work: Dredging for maintenance of channel, at 20½ cents per cubic yard.

COAL FOR U. S. DREDGE "GILLESPIE."

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: West Virginia Crown Hill, $3.45 per ton; Youghiogheny, $3.45 per ton; Hocking Valley, $3.20 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $3.05 per ton.

Contractor: S. P. Bennett Fuel and Ice Company.
Date of contract: April 11, 1908.
Date of approval: April 23, 1908.
Date of beginning: April 23, 1908.
Date of expiration: December 31, 1908.
Rates: Youghiogheny Gas Pool 2, $3.40 per ton; West Virginia Yellow Jacket, $3.35 per ton; Hocking Valley, $3.15 per ton; Saginaw, $2.90 per ton; Pittsburg No. 8, $3 per ton.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by deputy collector of customs at Manistee, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	2,200	1,043,902
Sail	272	4,496
Total	2,472	1,048,398

Maximum draft, 16 feet.

Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Bark	215	Bark	14,557
Coal	1,267	Cement	4,100
Iron ore	1,450	Horses	15
Lumber	1,514	Lumber	134,334
Merchandise, miscellaneous	14,697	Merchandise, miscellaneous	8,405
Stone	1,900	Salt	169,870
Ties	522	Shingles	2,350
Timber	630	Wood	1,027
Total	22,195	Total	334,669

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Total freight carried:	Tons.
1906	443,931
1907	356,864
Decrease	87,067

N N 11.

HARBOR OF REFUGE AT PORTAGE LAKE, MANISTEE COUNTY, MICHIGAN.

The channel between the piers and on the outer bar was dredged October 14 to November 4 by the U. S. dredge *Gillespie*, with the result of providing a depth of 18 feet between the piers and 20 feet on the bar. The dredged quantity was 38,377 cubic yards, and the cost of the work was $4,959.55, including contingencies, and cost of survey for 1908.

The available depths found by soundings made May 4 to 8 are as follows: Outside, 17.1 feet in front of the entrance, with 18 feet on line of north pier and 19 feet on line of south pier; between the piers 17 feet for a width of 120 feet.

The stated depths refer to the stage of zero of gauge.

Under a contract with the Leathem & Smith Towing and Wrecking Company, dated February 4, 1908, the following parts of the piers were refilled with stone: North pier, stations 0 to 13+35 and 15+96 to 20+87; south pier, stations 18+93 to 22+91. The total quantity of stone used was 559.12 cords, and the cost of the work was $4,960.52, including contingencies.

Money statement.

July 1, 1907, balance unexpended		$12,928.29
June 30, 1908, amount expended during fiscal year for maintenance of improvement		9,920.07
July 1, 1908, balance unexpended		3,008.22
Amount (estimated) required for completion of existing project		15,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$15,000.00	
For maintenance of improvement	3,000.00	
		18,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS

March 3, 1879	$10,000.00	August 18, 1894	$25,000.00
June 14, 1880	10,000.00	June 3, 1896	25,000.00
March 3, 1881	10,000.00	March 3, 1899	75,000.00
August 2, 1882	25,000.00	June 6, 1900	85,000.00
July 5, 1884	12,500.00	June 13, 1902	59,000.00
August 5, 1886	15,000.00	March 2, 1907	10,000.00
August 11, 1888	10,000.00		
September 19, 1890	8,000.00	Total	379,500.00

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CONTRACT IN FORCE.

STONE.

Contractor: Leathem & Smith Towing and Wrecking Company.
Date of contract: February 4, 1908.
Date of approval: February 26, 1908.
Date of beginning: Opening of navigation 1908.
Date of expiration: September 30, 1908.
Work: Furnishing, delivering, and placing about 60 cords of 500-pound stone for filling, at $8.97 per cord, and about 495 cords of 100-pound stone for filling, at $7.97 per cord.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by the Pere Marquette Line steamers, Manistee, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	360	169,08[illegible]

Maximum draft, 17 feet.

Receipts and shipments by vessels, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Merchandise, miscellaneous	73	Merchandise, miscellaneous	3,72[illegible]

Total freight carried in 1907, 3,793 tons.

N N 12.

IMPROVEMENT OF HARBOR AT ARCADIA, MICHIGAN.

Between July 17 and August 3, 1907, the channel between the piers and outside was dredged, under the contract with Greiling Brothers, and a depth of 12 feet for a width of 60 feet was restored for the time being. The dredged quantity was 18,353 cubic yards, and the cost of the work was $4,084.57, including contingencies.

Soundings made May 9 to 11, 1908, showed the following available depths: Outside, 10.9 feet on line of north pier, 9.5 feet in front of entrance, and 12.1 feet on line of south pier; between the piers, 7.5 feet close to the north pier, but only 5.9 feet in midchannel.

Dredging under a contract with Greiling Brothers, dated May 8, 1908, was begun May 22 and completed June 18, with the result of restoring a depth of 12 feet for a width of 50 feet. The amount dredged was 14,150 cubic yards, and the expenditures on account of this contract during the year were $2,708.43, including contingencies.

The stated depths refer to the stage of zero of gauge.

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Money statement.

July 1, 1907, balance unexpended	$7,254.52
June 30, 1908, amount expended during fiscal year for maintenance of improvement	6,793.00
July 1, 1908, balance unexpended	461.52
July 1, 1908, outstanding liabilities	77.00
July 1, 1908, balance available	384.52
July 1, 1908, amount covered by uncompleted contracts	290.07
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, one year to complete project, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	3,000.00

APPROPRIATIONS.

March 3, 1905	$6,000
March 2, 1907	6,000
Total	12,000

CONTRACTS IN FORCE.

DREDGING.

Contractor: Greiling Brothers.
Date of contract: April 3, 1907.
Date of approval: April 15, 1907.
Date of beginning: May 2, 1907.
Date of expiration: October 2, 1907.
Work: Dredging for maintenance of channel, at 21½ cents per cubic yard.

Contractor: Greiling Brothers.
Date of contract: May 8, 1908.
Date of approval: May 22, 1908.
Date of beginning: June 9, 1908.
Date of expiration: October 9, 1908.
Work: Dredging for maintenance of channel, at 20½ cents per cubic yard.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by Mr. George F. Beaver, at Arcadia, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	302	71,892
Sail	42	7,200
Other craft	1,140	31,200
Total	1,484	109,792

Maximum draft, 12 feet.

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Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Barrels, baskets, and crates	710	Bark	150
Household goods	75	Fish	41
Lumber	25	Fruit	25,170
Machinery	150	Furniture	300
Merchandise, miscellaneous	20,500	Grain	500
Wire fencing	200	Hay	350
		Meats	20
		Potatoes	22,365
Total	21,660	Total	48,896

Total freight carried:	Tons.
1907	70,556
1906	2,014
Increase	68,542

N N 13.

IMPROVEMENT OF FRANKFORT HARBOR, MICHIGAN.

Between April 10 and 16, 1908, the outer approach to the channel was deepened by the U. S. dredge *Gillespie*, and 9,556 cubic yards of sand were removed. The cost of this work was $1,482.56, including contingencies.

The available depths on May 13 to 14, 1908, as shown by soundings made at that time, were as follows: Outside, 18 to 20 feet in front of the entrance, 21 feet on line of north pier, and 19 feet on line of south pier; between the piers, 18.2 feet in mid-channel. The depths refer to the level of zero of gauge.

The following repairs were made by day labor and with purchased materials: In the south pier the outer cross wall of the superstructure was repaired and its connections with the side and interior longitudinal walls were strengthened, and the top course of the front wall was repaired in three different places for an aggregate length of 300 feet. In the north pier the damaged timbers at the outer end in the upper six courses were removed, and the work was rebuilt. These repairs extended for a length of 67 feet in the top course and for a length of 17 feet in the sixth course from the top. In addition the front wall of the pier was repaired in a number of places between stations 1+63 and 13+97.

The above work was done between August 31 and October 22, 1907.

Between June 11 and 17 the outer end of the north pier was again repaired in the upper three courses for a length of 23 feet, commencing at the outer end, as also the front wall of the pier between stations 10 and 11. The expenditures on account of these repairs were $1,501.34.

Under contract dated February 4, 1908, the Leathem & Smith Towing and Wrecking Company refilled the north pier between stations 0 and 3+95 and between stations 15+72.5 and 16+97.5, and the south pier between stations 16+80 and 19+00 with 229.86 cords of stone, at a cost of $2,035.21, including contingencies.

A contract was entered into under date of April 2, 1908, with Burk, Smith & Nelson for repairing the damaged outer end of the south

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pier and at the same time extending the pier by a crib 100 feet long, 40 linear feet of which are designed to replace the destroyed portion of the pier. Preliminary operations under this contract were begun June 25. The sum of $49.18 was expended during the year on this contract for engineering contingencies.

Money statement.

July 1, 1907, balance unexpended		$40,764.83
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$49.18	
For maintenance of improvement	5,019.11	
		5,068.29
July 1, 1908, balance unexpended		35,696.54
July 1, 1908, outstanding liabilities		117.00
July 1, 1908, balance available		35,579.54
July 1, 1908, amount covered by uncompleted contracts		15,713.26
Amount (estimated) required for completion of existing project		13,200.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908		13,200.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

Aux Becs Scies, Michigan:		Frankfort, Mich.—Cont'd.	
June 23, 1866	$88,541.00	July 5, 1884	$5,000.00
March 2, 1867	10,000.00	August 5, 1886	7,000.00
July 25, 1868 (allotment)	10,000.00	August 11, 1888	8,000.00
April 10, 1869 (allotment)	29,318.85	September 19, 1890	10,000.00
July 11, 1870	10,000.00	July 13, 1892	10,000.00
March 3, 1871	10,000.00	August 18, 1894	50,000.00
Frankfort, Michigan:		June 3, 1896	15,000.00
June 10, 1872	10,000.00	March 3, 1899	35,000.00
March 3, 1873	10,000.00	June 13, 1902	54,500.00
June 23, 1874	10,000.00	March 3, 1905	20,000.00
March 3, 1875	10,000.00	March 2, 1907	20,000.00
August 14, 1876	3,000.00	Total	478,159.85
June 18, 1878	8,800.00	Amount covered into the Treasury (Report, 1871, p. 133)	5,721.50
March 3, 1879	4,000.00		
June 14, 1880	5,000.00		
March 3, 1881	10,000.00	Balance	472,438.35
August 2, 1882	15,000.00		

CONTRACTS IN FORCE.

COAL FOR U. S. DREDGE "GILLESPIE."

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: West Virginia Crown Hill, $3.45 per ton; Youghiogheny, $3.45 per ton; Hocking Valley, $3.20 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $3.05 per ton.
Contractor: S. P. Bennett Fuel and Ice Company.
Date of contract: April 11, 1908.

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Date of approval: April 23, 1908.
Date of beginning: April 23, 1908.
Date of expiration: December 31, 1908.
Rates: Youghiogheny Gas Pool 2, $3.40 per ton; West Virginia Yellow Jacket, $3.35 per ton; Hocking Valley, $3.15 per ton; Saginaw, $2.90 per ton; Pittsburg No. 8, $3 per ton.

STONE.

Contractor: Leathem & Smith Towing and Wrecking Company.
Date of contract: February 4, 1908.
Date of approval: February 26, 1908.
Date of beginning: Opening of navigation, 1908.
Date of expiration: September 30, 1908.
Work: Furnishing, delivering, and placing about 35 cords of 500-pound stone for filling, at $8.97 per cord, and about 195 cords of 100-pound stone for filling, at $7.97 per cord.

EXTENSION AND REPAIR OF SOUTH PIER.

Contractor: Burk, Smith & Nelson.
Date of contract: April 2, 1908.
Date of approval: May 6, 1908.
Date of beginning: May 22, 1908.
Date of expiration: November 1, 1908.
Rates: Cutting down and removing old work, lump sum of $500; dredging for crib foundations, 50 cents per cubic yard; foundation piles, 65 cents per linear foot; oak guard piles, 60 cents per linear foot; oak timber, $60 per thousand; hemlock timber, $30 per thousand; white, Norway, or southern pine or Douglas fir timber, $42 per thousand; white, Norway, or southern pine or Douglas fir planks, for decking, $40 per thousand; driftbolts, screw bolts, and spikes, 4 cents per pound; stone, $9 per cord of 128 cubic feet.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by the deputy collector of customs at Frankfort, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	1,698	1,957,194
Sail	82	6,370
Total	1,780	1,963,564

Maximum draft, 18 feet.

Receipts and shipments by vessels, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Barley	5,061	Apples	25
Coal	200	Coal	45,134
Copper	2,279	Freight cars:	
Corn	550	Loaded	298,675
Flour	2,741	Empty	660
Freight cars:		Iron	108
Loaded	99,610	Lumber	11,475
Empty	10,995	Merchandise, miscellaneous	13,859
Hay	33	Sawdust	150
Iron	3,425	Shingles	31
Malt	4,340	Slabs	4,395
Merchandise, miscellaneous	97,846		
Oats	16,782		
Rye	6,135		
Stone	687		
Total	250,684	Total	379,498

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Total freight carried:	Tons.
1906	719,259
1907	630,182
Decrease	89,077

N N 14.

IMPROVEMENT OF CHARLEVOIX HARBOR, MICHIGAN.

Contractor Nelson J. Gaylord completed his contract for the repairs of piers and revetments on November 30, 1907, by depositing 30 cords stone in the north pier of the lower channel between stations 3+45 and 5+15, and 10 cords stone in the north revetment of the upper channel. The expenditures during the fiscal year on account of this contract were $3,028.22, including contingencies.

Under a special agreement Mr. Gaylord also deposited 70.63 cords stone in the south pier of the lower channel between stations 14 and 15+29, at a cost of $517.16, including contingencies.

Under date of March 14, 1908, a contract was entered into with Burk, Smith & Nelson for repairing the inner end of the south pier of the lower channel. Operations were begun March 28. The unserviceable part of the pier between stations 0 and 1+95.5 was entirely removed, and replaced by a new sheet-piled pile structure consisting of two parallel rows of round piles and a wall of triple lap sheet piles, with wales, guide, and binding timbers and tie-rods, and of a new superstructure 4 feet high in the front wall and 2 feet high in the rear wall, with a plank walk 3 feet wide on top. The defective top course of the superstructure between stations 1+95.5 and 2+53 was also renewed. The contract was completed June 22, and the expenditures on its account during the year were $1,354.45, including contingencies.

Between July 21 and 30, 1907, the upper two courses of the south pier between stations 9+53.5 and 9+70.5, and between stations 18+14 and 18+43.5, and the decking between stations 17+79 and 18+96 were repaired by day labor and purchased material at a cost of $138.29.

Under the contract of February 4, 1908, the Leathem & Smith Towing and Wrecking Company deposited 226.75 cords stone in the south pier between stations 10+79 and 15+29, and between stations 18+26 and 19+29. This work was done June 19–23, and its cost was $2,228.55, including contingencies.

The available depths of water, as shown by soundings made May 15 to 18, 1908, were as follows: Outside of the lower channel, 18 to 20 feet opposite the entrance, with 17.3 feet on line of north pier and 15.7 feet on line of south pier. There was 16.6 feet between the piers of the lower channel, and 15.9 feet in the lower approach to the upper channel. The cost of this survey and also for the one made in July, 1907, was $192.

The above depths refer to the level of zero of gauge.

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Money statement.

July 1, 1907, balance unexpended	$26,448.79
June 30, 1908, amount expended during fiscal year for maintenance of improvement	7,458.67
July 1, 1908, balance unexpended	18,990.12
July 1, 1908, outstanding liabilities	104.00
July 1, 1908, balance available	18,886.12
July 1, 1908, amount covered by uncompleted contracts	3,742.71
Amount (estimated) required for completion of existing project	23,750.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:	
For works of improvement	$23,750.00
For maintenance of improvement	6,000.00
	29,750.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 14, 1876	$10,000.00	July 13, 1892	$10,000.00
June 18, 1878	12,000.00	August 18, 1894	8,000.00
March 3, 1879	9,000.00	June 3, 1896	20,000.00
June 14, 1880	10,000.00	March 3, 1899	15,000.00
March 3, 1881	10,000.00	June 13, 1902	20,000.00
August 2, 1882	10,000.00	March 3, 1905	25,000.00
July 5, 1884	10,000.00	March 2, 1907	20,000.00
August 5, 1886	10,000.00	Miscellaneous receipts	119.65
August 11, 1888	12,500.00		
September 19, 1890	9,000.00	Total	220,619.65

CONTRACTS IN FORCE.

REPAIR OF PIER AND REVETMENTS.

Contractor: Nelson J. Gaylord.
Date of contract: September 28, 1905.
Date of approval: October 23, 1905.
Date of beginning: May 1, 1906.
Date of expiration: November 1, 1906. (Time limit waived.)
Rates: Cutting down and removing old work, 75 cents per linear foot; oak piles, 34 cents per linear foot; oak timber, $45 per M; white, Norway, or southern pine, or Douglas fir timber, $34.50 per M; driftbolts, 3½ cents per pound; screw bolts and tie-rods, 4 cents per pound; stone, $6.85 per cord.

COAL FOR U. S. DREDGE "GILLESPIE."

Contractor: Century Fuel Company.
Date of contract: May 14, 1907.
Date of approval: June 15, 1907.
Date of beginning: June 15, 1907.
Date of expiration: December 31, 1907.
Rates: West Virginia, Crown Hill, $3.45 per ton; Youghiogheny, $3.45 per ton; Hocking Valley, $3.20 per ton; Saginaw, $3 per ton; Pittsburg No. 8, $3.05 per ton.

Contractor: S. P. Bennett Fuel and Ice Company.
Date of contract: April 11, 1908.
Date of approval: April 23, 1908.
Date of beginning: April 23, 1908.

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Date of expiration: December 31, 1908.
Rates: Youghiogheny Gas Pool 2, $3.40 per ton; West Virginia Yellow Jacket, $3.35 per ton; Hocking Valley, $3.15 per ton; Saginaw, $2.90 per ton; Pittsburg No. 8, $3 per ton.

STONE.

Contractor: Leathem & Smith Towing and Wrecking Company.
Date of contract: February 4, 1908.
Date of approval: February 26, 1908.
Date of beginning: Opening of navigation, 1908.
Date of expiration: September 30, 1908.
Work: Furnishing, delivering, and placing about 55 cords of 500-pound stone for filling, at $10.23 per cord, and about 182 cords of 100-pound stone for filling, at $9.23 per cord.

REPAIR OF SOUTH PIER.

Contractor: Burk, Smith & Nelson.
Date of contract: March 14, 1908.
Date of approval: March 30, 1908.
Date of beginning: May 1, 1908.
Date of expiration: September 1, 1908.
Rates: Cutting down and removing old work, $2 per linear foot; oak piles, 33 cents per linear foot; oak timber, $60 per M; pine or Douglas fir timber, $42 per M; pine or Douglas fir plank for sheet piles, $45 per M; pine or Douglas fir plank for decking, $40 per M; driftbolts, screw bolts, carriage bolts, tie-rods, and spikes, 4 cents per pound.

COMMERCIAL STATISTICS FOR CALENDAR YEAR ENDING DECEMBER 31, 1907.

[Compiled from statement furnished by the deputy collector of customs at Charlevoix, Mich.]

Vessels entered and cleared.

Character.	Number.	Tonnage.
Steam	208	162,644
Sail	106	16,411
Total	314	179,055

Maximum draft, 16.6 feet lower channel and 15.9 feet upper channel.

Receipts and shipments by vessel, 1907.

Articles received.	Tons.	Articles shipped.	Tons.
Brick	92	Acetate of lime	205
Cabbage	2	Apples	1,140
Cement	460	Brick	205
Coal	2,468	Cedar posts	80
Corn	1,092	Cement	98
Extract of bark	527	Hair	85
Feed	30	Hemlock tan bark	710
Hay	125	Lumber	31,869
Merchandise, miscellaneous	6,299	Merchandise, miscellaneous	1,511
Oats	40	Slabs	8,529
Potatoes	2		
Sacking	14		
Soda ash	44		
Stone	2,781		
Sugar	200		
Vinegar	6		
Wheat	420		
Total	14,602	Total	44,382

Total freight carried:	Tons.
1907	58,984
1906	36,413
Increase	22,571

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N N 15.

IMPROVEMENT OF PETOSKEY HARBOR, MICHIGAN.

Burk, Smith & Nelson began operations under their contract of June 8, 1907, for the extension of the breakwater by a crib 100 feet long and for repairing the stone section of the breakwater at its inshore end on July 10, 1907. The crib was constructed and sunk on its stone foundation on November 6, and a quantity of stone was placed in the stone part of the breakwater for its repairs before the close of the working season on December 7, 1907. Operations were resumed March 12, 1908, the four courses of superstructure were built on the crib, filled with stone and decked over, and an additional quantity of stone was placed in the stone section. The total quantity of stone used in the repair of the latter was 312.52 cords. The contract was completed May 25, 1908, and the expenditures on its account were $22,001.84, including contingencies, of which $17,128.26 were for construction and $4,873.58 for maintenance.

Money statement.

July 1, 1907, balance unexpended		$22,010.18
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$17,128.26	
For maintenance of improvement	4,873.58	
		22,001.84
July 1, 1908, balance unexpended		8.34
Amount (estimated) required for completion of existing project		56,900.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$15,000.00	
For maintenance of improvement	3,000.00	
		18,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

September 19, 1890	$15,000	June 13, 1902	$15,000
July 13, 1892	20,000	March 3, 1905	20,000
August 18, 1894	10,000	March 2, 1907	17,500
June 3, 1896	8,000		
March 3, 1899	20,000	Total	125,500

CONTRACT IN FORCE.

EXTENSION AND REPAIR OF BREAKWATER.

Contractor: Burk, Smith & Nelson.
Date of contract: June 8, 1907.
Date of approval: June 25, 1907.
Date of beginning: July 11, 1907.
Date of expiration: December 1, 1907. (Time limit waived.)
Rates: Oak timber, $60 per thousand; white, Norway, or southern pine, $45 per thousand; hemlock timber, $31 per thousand; driftbolts and screw bolts, 4 cents per pound; spikes, 5 cents per pound; stone for crib filling and riprap, $9.25 per cord; stone for repairs, $15 per cord.

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APPENDIX O O.

IMPROVEMENT OF RIVERS AND HARBORS IN THE DETROIT, MICHIGAN, DISTRICT.

REPORT OF LIEUT. COL. C. McD. TOWNSEND, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Ship channel connecting waters of the Great Lakes between Chicago, Duluth, and Buffalo.
2. St. Marys River at the Falls, Michigan.
3. Operating and care of St. Marys Falls Canal, Michigan.
4. Hay Lake and Neebish channels, St. Marys River, Michigan.
5. Cheboygan Harbor, Michigan.
6. Alpena Harbor (Thunder Bay River), Michigan.
7. Saginaw River, Michigan.
8. Sebewaing River, Michigan.
9. Harbor of refuge at Harbor Beach, Lake Huron, Michigan.
10. Mouth of Black River, Rouge River, and Monroe Harbor, Michigan.
11. Black River at Port Huron, Michigan.
12. Operating and care of St. Clair Flats Canal, Michigan.
13. Clinton River, Michigan.
14. Detroit River, Michigan.
15. Removing sunken vessels or craft obstructing or endangering navigation.

UNITED STATES ENGINEER OFFICE,
Detroit, Mich., July 17, 1908.

SIR: I have the honor to submit herewith the annual report relative to the works under my charge during the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

C. McD. TOWNSEND,
Lieut. Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

O O 1.

IMPROVEMENT OF SHIP CHANNEL CONNECTING WATERS OF THE GREAT LAKES BETWEEN CHICAGO, DULUTH, AND BUFFALO.

The work in progress is under the project approved October 20, 1892, which contemplated a navigable depth of 20 feet at mean stage of water by the excavation of channels, having a minimum width of 300 feet, through the shallows of the connecting waters of the Great Lakes between Chicago, Duluth, and Buffalo. The improved channels were made available in 1897, but, as the water levels have been

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continuously below the mean stage, the actual navigable depth has been from 1 to 3 feet less than the 20 feet contemplated.

The subproject approved October 16, 1902, provided for the expenditure of the balance of the appropriation then available in widening and deepening the channel at certain critical points to a depth of 21 feet below the low-water reference planes therein suggested, these planes being based on a stage of 601.5 feet for Lake Superior and 578.8 feet for Lake Huron and 571 for Lake Erie, referred to mean tide at New York by system of levels then existing.

All of this balance has now been expended and applied on this work, excepting a small amount applied to office expenses and the policing of boats through St. Clair River. An allotment of $5,000 from St. Marys River appropriation was authorized to complete the improvement through Vidal shoals to provide a channel approach to new lock and canal 1,000 feet wide and 22 feet below 601.5.

The work done in St. Marys River during the past fiscal year is as follows:

Round Island Shoal No. 2.—Under contract with The Lake Erie Dredging Company dated May 25, 1906, the channel through Round Island Shoal No. 2 was widened by 175 feet. During the year a derrick boat worked two hundred and eleven hours and removed 390 cubic yards of material. The work was commenced August 20, 1906, and completed August 5, 1907. The channel through this shoal is now 975 feet wide and 23 feet deep below 601.5 feet.

Vidal shoals.—The deepening of the channel through Vidal shoals to a depth of 22 feet below 601.5 feet for a width of 1,000 feet was continued by hire of derrick boat employed by the working hour. The derrick boat worked five hundred and forty-three and two-tenths hours, and removed 1,190 cubic yards of bowlders and broken stone from an area of 58,467 square yards. About thirty days' work under this contract remains to be done to complete the improvement.

The necessary stakes were placed for use of contractors and final surveys made of Round Island Shoal No. 2.

Money statement.

July 1, 1907, balance unexpended	$11,397.20
June 30, 1908, amount expended during fiscal year for works of improvement	9,866.75
July 1, 1908, balance unexpended	1,530.45
July 1, 1908, balance available	1,530.45

APPROPRIATIONS.

July 13, 1892	$375,000	June 4, 1897	$1,090,000
March 3, 1893	875,000		
March 2, 1895	500,000	Total	3,340,000
June 11, 1896	500,000		

CONTRACTS IN FORCE.

CONTRACT DATED MAY 25, 1906.

Name of contractor: The Lake Erie Dredging Company, Buffalo, N. Y.
Amount and character of work: $34,043.26; dredging Item A, Round Island Shoal 2.

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Price per unit: 49 cents per cubic yard, bank measurement (full rate), and 24½ cents per cubic yard, bank measurement (half rate).
Date of approval: June 5, 1906.
Date of beginning work: July 24, 1906.
Date of expiration: About July 15, 1907 (150 good working days).
Date of completion: August 5, 1907.

EMERGENCY CONTRACT DATED AUGUST 14, 1907.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: $1,001.21, under this appropriation; time work by steam derrick boat, etc.
Price per unit: $6.75 per working hour; dynamite, 17 cents per pound.
Date of beginning work: August 15, 1907.
Date of completion: August 31, 1907, under this appropriation.

EMERGENCY CONTRACT DATED NOVEMBER 26, 1907.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: Indefinite under this appropriation; time work by steam derrick boat, etc.
Price per unit: $6.75 per working hour; dynamite, 16 cents per pound.
Date of beginning work: Indefinite under this appropriation.
Date of expiration: Indefinite under this appropriation.

O O 2.

IMPROVEMENT OF ST. MARYS RIVER AT THE FALLS, MICHIGAN.

The work now in progress comprises the construction of a movable dam, the acquisition of lands, etc., covered by the project of 1886 and its extensions; also the canal widening and further improvement authorized by the river and harbor act of June 13, 1902, and the construction of a new lock and canal provided for by the river and harbor act of March 2, 1907.

The operations for the fiscal year were as follows:

Arrangements for the purchase of lands needed for canal purposes have included the acquisition of 6.52 acres from the Chandler-Dunbar Water Power Company for a nominal consideration of $1. The deed for this property was obtained in May, 1907, and, after some changes in terms, was accepted in February, 1908, and placed on record. A quitclaim deed for 0.84 acre was offered by the Sault Ste. Marie Bridge Company with such conditions that it could not be accepted. A quitclaim deed has also been offered by the St. Marys Power Company of its claim to a portion of the lands deeded by the Chandler-Dunbar Water Power Company. The lands still to be acquired include 29.64 acres from the Chandler-Dunbar Water Power Company needed for new lock and canal, and 0.06 acre between Water street and the canal, condemnation proceedings in regard to the latter having been commenced.

The work of widening the present canal above the locks consists in excavating earth and rock from an area about 3,700 feet long and averaging 125 feet in width to a depth of 24.6 feet below 601.5 feet, and constructing the necessary revetment walls. Under contract for this work dated March 23, 1908, the Great Lakes Dredge and Dock Company began operations with one steam shovel on May 6, 1908, and a second shovel was started June 17, 1908, the material being conveyed to dumps by cars. The shovels have worked an aggregate

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of 61 shifts of eight hours each, and have excavated 34,124 cubic yards of Class A, or soft material, and 5,277 cubic yards of Class B, or hard material, from an area of 21,225 square yards. Channeling was commenced on June 23, 1908, a total of 880 square feet of face being channeled.

The construction of the sill of movable dam for the south or present channel of the canal was completed by Government force during the closed season of navigation, 521 cubic yards of rock being excavated and 373 cubic yards of concrete placed. The center pier for the dam and the two abutments for present channel are completed, so far as this is practicable before the castings for turntable and bumpers are received. The plans for superstructure, including details of machinery and specifications, are nearly completed.

A small amount of work has been done in cleaning up the property lying between Water street and the canal, purchased for canal purposes, this work having included some repairs to warehouses and the razing of old buildings.

The stone crusher at West Neebish was operated forty-six days between July 1 and November 30, 1907, and 1,422 cubic yards of stone delivered at the canal for use on piers and movable dam foundations.

Under contract dated September 17, 1907, with the Elk Cement and Lime Company, 750 barrels of cement was purchased and submitted to the usual tests.

Under contract dated October 10, 1907, the H. B. Waite Lumber Company furnished 600,648 feet B. M. of fir timber for use in building the revetment walls for the widened canal.

The construction of the new lock and canal is proceeding in accordance with plan 3 of the report of December 3, 1906, adopted by Congress in the river and harbor act approved March 2, 1907, providing for a lock 1,350 feet long between gates, giving a usable length of not less than 1,300 feet with a least depth of 24.5 feet below extreme low water, and a width of at least 80 feet, and a separate canal 260 to 300 feet in width.

The work in progress during the fiscal year is as follows:

On the site of the new lock 10 holes 2½ inches in diameter were drilled to a depth of from 56 to 100 feet, or from 13 to 31 feet below the bottom of the foundations, and cores obtained showing the character of the rock strata. The work was commenced September 15, 1907, and completed November 8, 1907, a Davis Calyx drill being employed. A total of 761 linear feet of drilling was accomplished at a cost of $2,851.62.

The excavation of a portion of the lock pit has been accomplished under two emergency contracts, 7,642 cubic yards of earth and broken rock, at 57 cents per cubic yard, being removed between December 17, 1907, and May 16, 1908, and 11,815 cubic yards, at 49¾ cents per cubic yard, between March 9 and June 6, 1908, or a total of 19,457 cubic yards at a cost of $10,233.90, or 52.6 cents per cubic yard. The material was used for the construction of dikes and fills required in connection with cofferdam and pier construction. A small amount of material has also been excavated by day labor from that portion of the lock pit within the limits of Island No. 5.

The construction of a cofferdam surrounding the lock pit has been in progress during the year as follows: (*a*) Southwest cofferdam—excavation of a trench about 5 feet wide, 180 feet long, and from 25

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feet to 33 feet deep, extending to bed rock, and refilling the same with clay, was started February 13, 1908, under contract, but abandoned by the contractor March 12, 1908, and completed April 17, 1908, with the exception of some additional clay on top, by day labor. The work accomplished was 1,060 cubic yards of excavation, 16,106 feet B. M. of sheathing, and 981 cubic yards of clay puddled in place, at a total cost to the United States of $3,459.74, or $19.22 per linear foot of dam. (*b*) West cofferdam—a fill was made of material from canal widening excavation to divert the water from the old head race of the Chandler-Dunbar Water Power Company, and behind this fill a trench is being excavated and filled with clay by day labor. One hundred and twenty feet of the least difficult portion of this dam, in the bed of the old head race, is completed to elevation 116 canal datum, at a cost of $838.38, or $7 per linear foot of dam. (*c*) Northwest cofferdam—a fill is being made of material from canal widening excavation, to close off a portion of the new forebay of the Chandler-Dunbar Water Power Company and permit the construction of the northwest cofferdam in the dry. (*d*) North cofferdam—material excavated from the lock pit under contract was used to construct two parallel dikes along the westerly portion of the north cofferdam, and by day labor a trench between the dikes was excavated in the dry to bed rock, and refilled with clay puddled in place. About 1,313 linear feet of dam, averaging 8.63 feet in depth, has been constructed, except for some additional clay at the top, at a total cost of $13,634, or about $10.38 per linear foot of dam. For the easterly portion, to be built in the wet, a dredge employed by the working hour is excavating a trench, 22 feet wide on the bottom, within which is to be placed a crib dam with sheathed face. About 15,000 cubic yards, estimated, of sand, gravel, bowlders, and loose ledges of bed rock has been excavated and cast over from this trench, at a cost of $4,478.25. (*e*) East cofferdam—the excavation of a similar trench for the east cofferdam has been commenced under contract, but only about 650 cubic yards, car measurement, of material has been excavated. For use in cofferdams 5,449 cubic yards of clay was purchased under two contracts, at a total cost of $2,483.48; contract has been entered into for 720,000 feet B. M. of hemlock timber, of which 227,018 feet B. M. has been delivered.

Excavation has been made and three cribs partially built for a portion of the new northeast pier, to be used as a wharf for landing materials for the construction of new lock. For this work there was purchased under contract 300,216 feet B. M. of hemlock timber, at a cost of $5,974.30, and iron at a cost of $1,929.83. With dredge, employed by the working hour, about 6,228 cubic yards of material has been excavated, at a cost of $2,393.19; 30,410 cubic feet of timber has been framed, and 43,042 pounds of iron placed in the cribs by day labor, at a cost of $2,835.16 for framing. The substructure of one crib is completed and sunk in place.

The fill back of these cribs, to make land upon which to erect the necessary warehouses, has been commenced, about 12,500 cubic yards having been placed from lock pit and cofferdam excavations, the cost of this fill being covered by the cost of excavation.

Work on the new lock and canal also included surveys and estimates, and studies of walls, culverts, and machinery.

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The operations of the Michigan Lake Superior Powe
under its permit were inspected and conditions reported.
water level of Lake Superior above the canal for the mo
ruary having been below 601.5, the company was ordered
10, 1908, to decrease the flow through its canal, in accor
the terms of its permit. As the mean level again reach
June, the restrictions on the flow were removed June 11,

The changes in St. Marys River were noted for use in
Lake Survey Bulletin No. 17, and a draft of rules sugges
navigation of the river after the opening of the West Ne
nel was prepared.

Daily readings of water gauges above and below the
made throughout the year, and the monthly means and
are as follows:

[Elevation, in feet, above mean tide at New York, levels of 1877.

Month.	Monthly means.		Mean difference.	Month.	Monthly mean	
	Above locks.	Below locks.			Above locks.	Below locks.
1907.	*Feet.*	*Feet.*	*Feet.*	1908.	*Feet.*	*Feet.*
July	602.133	582.863	19.270	January	601.400	582.
August	602.306	583.068	19.238	February	601.060	582.
September	602.504	583.213	19.291	March	601.000	582.
October	602.515	582.795	19.720	April	600.942	581.
November	602.236	582.341	19.895	May	601.443	581.
December	601.880	581.915	19.965	June	601.922	582.

Money statements.

GENERAL IMPROVEMENT, INCLUDING CANAL WIDENING, ETC.

July 1, 1907, balance unexpended	$91
June 30, 1908, amount expended during fiscal year for works of improvement	[a] 5
July 1, 1908, balance unexpended	86
July 1, 1908, outstanding liabilities	17
July 1, 1908, balance available	846
July 1, 1908, amount covered by uncompleted contracts	660
Amount (estimated) required for completion of existing project	250
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	250,
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

[a] Actual expenditures during the fiscal year were $55,730.87, in addi
$5.77 and $5.51 paid by Treasury Department account of Duluth, South
and Atlantic Railway Company and Michigan Central Railway Compa
spectively, making the total expenditure $55,742.15; from this amount $1
(receipts from sale of condemned Government property) has been de
leaving the net expenditure $54,435.30.

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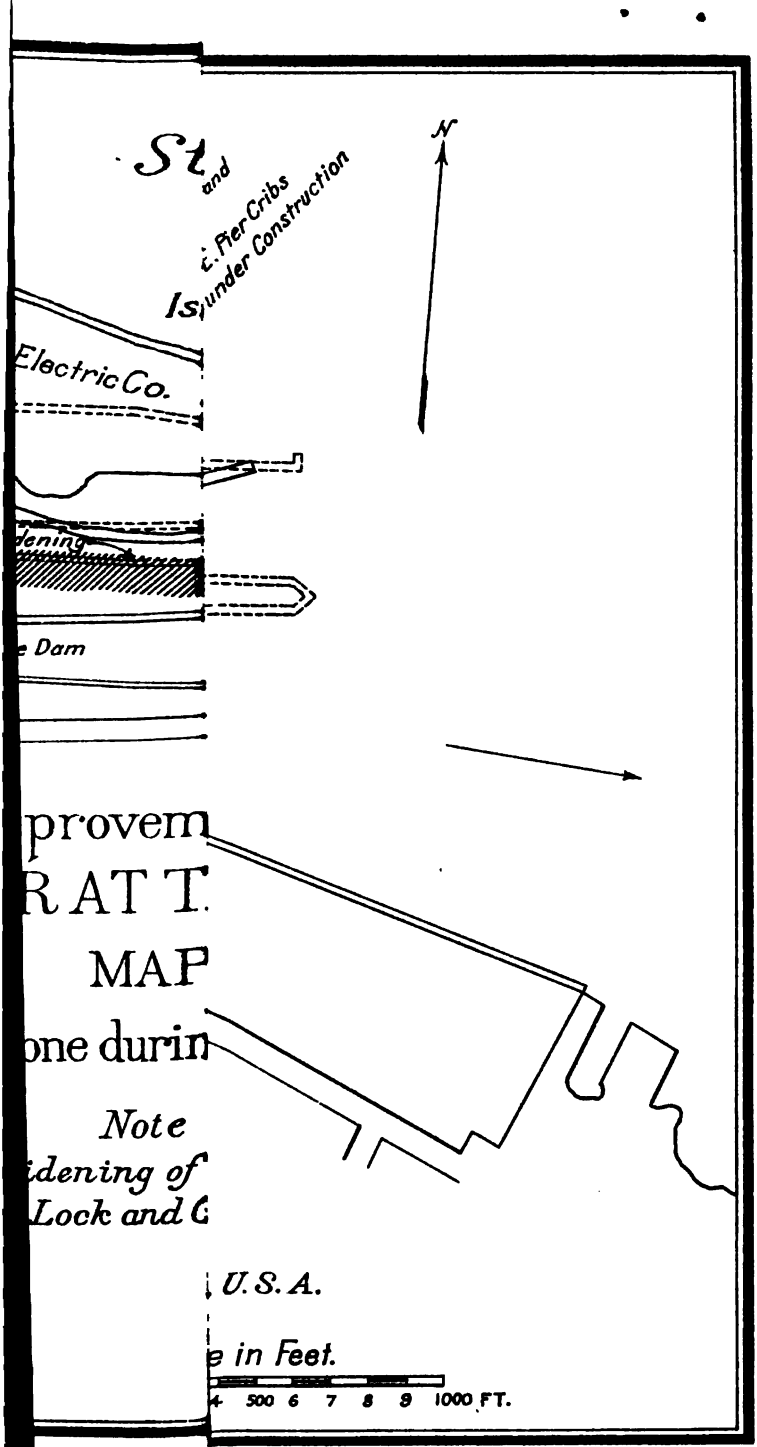

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NEW LOCK AND CANAL.

July 1, 1907, balance unexpended	$1,200,000.00
June 30, 1908, amount expended during fiscal year, for works of improvement	[a] 54,287.80
July 1, 1908, balance unexpended	1,145,712.20
July 1, 1908, outstanding liabilities	9,309.22
July 1, 1908, balance available	1,136,402.98
July 1, 1908, amount covered by uncompleted contracts	[a] 20,000.00
Amount (estimated) required for completion of existing project	5,000,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	500,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

PREVIOUS PROJECTS.

On past finished projects of 1856 to 1885, $2,875,692, including $10,000 diverted from Great Lakes harbors appropriation of 1864.

ON PRESENT PROJECTS.

GENERAL IMPROVEMENT, INCLUDING CANAL WIDENING, ETC.

August 5, 1886	$250,000	March 2, 1895	$483,865
August 11, 1888	1,000,000	March 3, 1905	420,000
September 19, 1890	900,000	June 30, 1906	100,000
March 3, 1891	600,000	March 4, 1907	250,000
March 3, 1893	1,230,000		
August 18, 1894	300,000	Total	5,533,865

NEW LOCK AND CANAL.

March 2, 1907	$1,200,000

CONTRACTS IN FORCE.

EMERGENCY CONTRACT DATED SEPTEMBER 17, 1907.

Name of contractor: Elk Cement and Lime Company, Petoskey, Mich.
Amount and character of work: $1,132.50 under this appropriation; furnishing and delivering Portland cement.
Price per unit: $1.51 per barrel.
Date of beginning work: October 7, 1907.
Date of expiration: December 6, 1907.
Date of completion: November 19, 1907.

CONTRACT DATED OCTOBER 10, 1907.

Name of contractor: H. B. Waite Lumber Company, Minneapolis, Minn.
Amount and character of work: $7,448.04; furnishing and delivering fir timber.

[a] Actual expenditures during the fiscal year were $54,391.38; from this amount $103.58 (payment by sureties on bond of McDonald & Fagan, contractors) have been deducted, making the net expenditure $54,287.80.

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Price per unit: $12.40 per thousand feet B. M., f. o. b. cars at Pacific coast points.
Date of approval: November 1, 1907.
Date of beginning work: November 30, 1907.
Date of expiration and completion: May 1, 1908.

CONTRACT DATED MARCH 23, 1908.

Name of contractor: Great Lakes Dredge and Dock Company, Chicago, Ill.
Amount and character of work: About $675,000; excavating, channeling, building cribs, filling cribs, mixing and placing concrete.
Price per unit: Soft material, 55 cents per cubic yard, bank measurement (full rate), and 27½ cents per cubic yard, bank measurement (half rate); rock, $1.30 per cubic yard, bank measurement (full rate), and 65 cents per cubic yard, bank measurement (half rate); channeling, 30 cents per square foot; framing, building, and placing cribs, 10 cents per cubic foot; filling, 30 cents per cubic yard; concreting, $4 and $5 per cubic yard.
Date of approval: April 2, 1908.
Date of beginning work: May 6, 1908.
Date of expiration: June 30, 1910.

EMERGENCY CONTRACT DATED JUNE 26, 1908.

Name of contractor: Fiborn Limestone Company, Marquette, Mich.
Amount and character of work: About $300 under this appropriation; furnishing and delivering crushed stone.
Price per unit: $1.03 and 85 cents per gross ton.
Date of beginning work: July 6, 1908.
Date of expiration: September 1, 1908.

EMERGENCY CONTRACT DATED AUGUST 14, 1907.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: $2,796.28 under this appropriation; time work by steam derrick boat, with diving plant, etc.
Price per unit: $6.75 per working hour; dynamite, 17 cents per pound.
Date of beginning work: August 15, 1907.
Date of expiration and completion: October 31, 1907.

EMERGENCY CONTRACT DATED NOVEMBER 26, 1907.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: About $3,000 under this appropriation; time work by steam derrick boat, with diving plant, etc.
Price per unit: $6.75 per working hour; dynamite, 16 cents per pound.
Date of beginning work: May 1, 1908, under this appropriation.
Date of expiration: Indefinite.

EMERGENCY CONTRACT DATED NOVEMBER 30, 1907.

Name of contractor: O. G. Brubaker and A. McKechnie, Sault Ste. Marie, Mich.
Amount and character of work: $4,355.94; excavating and building dike.
Price per unit: Fifty-seven cents per cubic yard.
Date of beginning work: December 17, 1907.
Date of expiration: March 9, 1908.
Date of completion: May 16, 1908.

EMERGENCY CONTRACT DATED DECEMBER 7, 1907.

Name of contractor: Louis Belanger, Sault Ste. Marie, Mich.
Amount and character of work: $1.470; furnishing and delivering clay.
Price per unit: Forty-two cents per cubic yard.
Date of beginning work: January 25, 1908.
Date of expiration: March 15, 1908.
Date of completion: March 19, 1908.

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EMERGENCY CONTRACT DATED DECEMBER 28, 1907.

Name of contractor: The Soo Lumber Company, Sault Ste. Marie, Mich.
Amount and character of work: $5,974.30; furnishing and delivering timber.
Price per unit: $19.90 per thousand feet B. M.
Date of beginning work: December 30, 1907.
Date of expiration: February 26, 1908.
Date of completion: June 8, 1908.

EMERGENCY CONTRACT DATED JANUARY 23, 1908.

Name of contractor: The Soo Hardware Company, Sault Ste. Marie, Mich.
Amount and character of work: One thousand nine hundred and twenty-nine dollars and eighty-three cents under this appropriation; furnishing and delivering iron and steel.
Price per unit: Drift bolts, $2.17½ per hundredweight; tie rods, $2.70 per hundredweight; square washers, $2.77 per hundredweight; turnbuckles, 90 cents each; fish plates, $2.72 per hundredweight; angles, $2.72 per hundredweight; 7-inch spikes, $2.40 per hundredweight; 5-inch spikes, $2.30 per hundredweight; ship spikes, $2.70 per hundredweight.
Date of expiration: March 23, 1908.
Date of completion: March 1, 1908.

EMERGENCY CONTRACT DATED FEBRUARY 6, 1908.

Name of contractors: A. B. MacDonald and Geo. F. Fagan, Sault Ste. Marie, Mich.
Amount and character of work: About $3,300; excavating, constructing clay wall, etc.
Price per unit: Excavating and depositing, $1.66 per cubic yard; constructing clay wall, $1.11 per cubic yard; sheathing, $25 per thousand feet B. M.
Date of beginning work: February 13, 1908.
Date of expiration: March 24, 1908.
Date of abandonment by contractors: March 12, 1908.
Date of completion by the United States: April 17, 1908.

EMERGENCY CONTRACT DATED MARCH 11, 1908.

Name of contractor: A. McKechnie, Sault Ste. Marie, Mich.
Amount and character of work: One thousand and thirteen dollars and forty-eight cents; furnishing and delivering clay.
Price per unit: Fifty-two cents per cubic yard.
Date of beginning work: March 12, 1908.
Date of expiration: April 20, 1908.
Date of completion: April 2, 1908.

EMERGENCY CONTRACT DATED MARCH 12, 1908.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: Five thousand eight hundred and seventy-seven dollars and ninety-six cents; excavating and depositing material.
Price per unit: Forty-nine and three-fourths cents per cubic yard.
Date of beginning work: March 13, 1908.
Date of expiration: June 15, 1908.
Date of completion: June 5, 1908.

EMERGENCY CONTRACT DATED MAY 13, 1908.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: Amount indefinite under this appropriation; time work by steam derrick boat, with clam shell, etc.
Price per unit: Six dollars and seventy-five cents per working hour; dynamite, 16 cents per pound.
Date of beginning work: Indefinite.
Date of expiration: Indefinite.

LEASE DATED MAY 25, 1908.

Name of lessor: Great Lakes Dredge and Dock Company, Chicago, Ill.
Amount and character of work: About $5,900; time work by dredging plant.

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Price per unit: Fifteen dollars and seventy-five cents per working hour.
Date of beginning work: June 1, 1908.
Date of expiration: About July 15, 1908.

EMERGENCY CONTRACT DATED JUNE 13, 1908.

Name of contractor: Pittsburgh Forge and Iron Company, Pittsburg, Pa.
Amount and character of work: About $1,000; furnishing and delivering bolts, rods, etc.
Price per unit: Tie-rods, 1.96¾ cents per pound; nuts, 3.21¾ cents per pound; washers, 2.21¾ cents and 1.81¾ cents per pound; bolts, 2.44 cents, 2.21¾ cents, and 2.11¾ cents per pound; bar iron, 1.71¾ cents per pound.
Date of expiration: July 1, 1908.

EMERGENCY CONTRACT DATED JUNE 15, 1908.

Name of contractor: Peninsula Bark and Lumber Company, Sault Ste. Marie, Mich.
Amount and character of work: About $11,000; furnishing and delivering timber.
Price per unit: $16.50, $15, and $19.50 per M feet B. M.
Date of beginning work: July 15, 1908.
Date of expiration: August 14, 1908.

EMERGENCY CONTRACT DATED JUNE 20, 1908.

Name of contractor: Henry Watson, Sault Ste. Marie, Mich.
Amount and character of work: About $2,200; excavating and depositing material.
Price per unit: Forty-two cents per cubic yard, bank measurement.
Date of beginning work: June 30, 1908.
Date of expiration: August 8, 1908.

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OPERATING AND CARE OF ST. MARYS FALLS CANAL.

During the fiscal year the canal was open to navigation two hundred and twenty-nine days, the closed period of one hundred and thirty-seven days being from December 12, 1907, to April 26, 1908. During the open period there passed through the canal 33,964,074 tons of freight, a decrease of 11,049,124 tons compared with the fiscal year 1907.

The total delays that occurred in locking vessels amounted to seventy-three hours and forty minutes, of which fifteen hours and thirty-five minutes occurred at the Poe lock and fifty-eight hours and five minutes at the Weitzel lock.

The accidents resulting in damage to property were minor ones and those to persons, with one exception, were not serious.

During the closed season repairs were made to both locks.

The complete statistics of lake commerce passing through the American and Canadian canals during the season of 1907, compiled from the official records of the St. Marys Falls Canal, are appended.

The estimated funds required for the year ending June 30, 1909, is $105,000, to be applied approximately as follows: For pay rolls, $81,800; for repairs, $11,800; for general supplies, $5,400; for electric lighting of buildings, locks, and grounds, $3,000, and for general contingencies, including office expenses, $3,000.

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More extended information regarding details of service, repairs, accidents, etc., is given in the following extract from the report of Mr. L. C. Sabin, general superintendent of the canal:

ORGANIZATION.

The regular force of 93 persons, viz, 1 general superintendent, 1 superintendent, 3 clerks, 1 chief engineman, 3 assistant superintendents, 1 overseer, 6 lock masters, 6 enginemen, 7 watchmen, 1 storekeeper, 3 recorders, 3 messengers, 9 first-grade lockmen, 9 second-grade lockmen, 15 third-grade lockmen, and 24 linemen, were severally employed from nine to twelve months in locking boats, office work, and care of property. A small force of men, varying from 5 to 45, was employed ten months in repairing piers, masonry, gates, grading, and care of grounds. A carpenter, painter, mason, and calker were occasionally employed.

REPAIRS.

The ordinary maintenance and fitting-out repairs included the repair or renewal of all damage, worn-out or broken parts of operating machinery, replacing broken masonry with concrete, refilling piers, the painting of gates, snubbing posts and electric-light poles, and testing of all machinery.

Two hundred and eight loose culvert rods in Poe lock were cut and threaded and supplied with turn-buckles. Six hundred and nine turn-buckles and 320 nuts were tightened.

Forty-five cubic yards of broken stone was removed from face of south wall of Poe lock.

About 150 cubic yards of débris was removed from forebay of Poe lock.

The old service gates at lower end of Weitzel lock have been replaced with new solid timber gates built of Oregon fir. Both hollow quoins were so badly worn by the iron straps of the old gates that it was necessary to recut the masonry of north quoin five-eighths inch and the south quoin 1 inch to true them up.

The repairs to southwest wide wall of the Weitzel lock consisted in removing about 400 cubic yards of badly heaved and disintegrated masonry and replacing same with concrete.

Two hundred and seventy-five linear feet of timber superstructure of southwest pier was repaired by replacing it with concrete.

About 300 feet of timber crib wall southeast of lower end of Weitzel lock, which has been slipping toward the canal, has been repaired by anchoring the cribs to oak deadmen placed in the bank 69 feet from the face.

The timber work of north and south sides of canal walls, lying between the canal gate masonry and abutments of the movable dam, was removed and replaced with concrete, 22 linear feet of the crib walls being so replaced.

Under emergency contract dated November 26, 1907, for hire of derrick boat, complete, at $6.75 per working hour, T. L. Durocher, contractor, was employed seventy and one-half hours and removed 515 cubic yards of loose rock, sand, and sunken wood from east approach to Poe lock.

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At the close of navigation the locks were unwatered and machinery laid up for the winter. The canal head gates were closed and the water drawn down to level of lock miter sill and leakage into canal removed by operating 10-inch centrifugal pump with electric power.

ACCIDENTS.

Two sailors were injured, one having his leg broken by getting caught in bight of line, and another his hand crushed by a parting cable. Mr. Thomas O'Brien, of Albion, N. Y., was killed by losing his balance and falling over side of masonry stairway to wall below.

There were 37 minor accidents, resulting in pulling out 5 snubbing posts, breaking 11 pieces of lock masonry, 5 timbers in canal piers, 4 iron straps, and 1 vertical timber in Weitzel lock gates, damaging decking of Poe lock gates and one oak wall fender, and breaking at nine different times the forms used for placing concrete superstructure of canal wall.

There were eight minor collisions between vessels while passing through the canal. One steamer struck the miter wall of Weitzel lock, damaging her bow badly, but without injury to the wall, and another steamer stripped her wheel by swinging her stern too close to pier.

DELAYS.

Poe lock.—The delays to navigation in the Poe lock amounted to fifteen hours and thirty-five minutes, as follows: Forty-five minutes, due to removing rope fenders from miter sills; one hour and ten minutes, removing loose stone from miter sills; seven hours and thirty minutes, repairing gate cables; twenty minutes, parting of towline; forty minutes, grounding of steamer on platform; thirty minutes, grounding of steamer at lower lock entrance; two hours and thirty-five minutes, backing steamers out of lock drawing too much water; one hour and thirty-five minutes, false placement of boats, and thirty minutes, due to slow movement and flooding boat out of lock.

Weitzel lock.—In this lock the delays amounted to fifty-eight hours and five minutes, as follows: Three hours and forty-five minutes, repairing broken gate cable and broken valve stem; twenty minutes, fouling of towline in steamer's wheel, and fifty-four hours, pumping out lock, repacking valve engines preparatory to filling pressure pipes with oil. This lock has not been put in service since the opening of navigation, on account of replacing the old service gates with new solid timber gates. This work, however, will be completed within a few days, and the lock put in commission.

NEW TELEPHONE SYSTEM.

One 60-point switchboard and 28 telephones have been installed; 1,777 feet of cable has been laid in tunnels, across locks, etc.; 9,049 feet of cable laid underground, and 18,500 feet of aerial wire strung. The switchboard is at present equipped for 40 phones, and with slight expense may be equipped for 60. It is protected by lightning arrester. Lead-covered cables lead from the switchboard to various distributing points about the canal and locks, the only overhead wires in use being those to serve five of the most remote instruments

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and along the north side of canal where the work of canal widening prevents present installation of underground cables. Four semi-portable booths have been placed at points where no inclosure was available for an instrument.

STRIKES.

The strike of the dock laborers at Duluth, Superior, and Two Harbors commenced July 15 and continued to July 31, when the men returned to work.

PANIC.

The result of the panic of 1907 is shown by the diminution in the canal traffic as compared with traffic for fiscal year ending June 30, 1908.

The expenditures during the fiscal year were $110,230.08, in addition to $65 transferred by Treasury Department to appropriation for survey of north and northwestern lakes for 2,000 copies of inset map for statistical report, making the total expenditures $110,295.08; from this amount $376.37 (proceeds of sale of condemned Government property deposited to credit of indefinite appropriation) have been deducted, leaving the net expenditures $109,918.71.

Summary of expenditures for operating and care of St. Marys Falls Canal, Michigan, for the fiscal year ending June 30, 1908.

Pay rolls	$84,318.07
Repair material, etc	16,078.56
General supplies	5,022.10
Electric lighting	3,180.08
Contingencies (including $65 paid by Treasury Department)	1,696.27
	110,295.08
Deduct amount received from sale of condemned property	376.37
Net expenditures during fiscal year	109,918.71

Statement of expenditures for operating and care of St. Marys Falls Canal, Michigan.

1882	$27,545.86	1897	$79,207.15
1883	36,335.77	1898	56,674.16
1884	29,486.29	1899	89,000.88
1885	29,064.52	1900	80,309.27
1886	26,089.12	1901	75,559.34
1887	21,832.55	1902	88,595.53
1888	30,003.46	1903	82,946.09
1889	30,603.61	1904	93,078.07
1890	36,723.27	1905	85,422.92
1891	44,960.79	1906	89,670.02
1892	61,241.09	1907	89,827.26
1893	41,828.07	1908	109,918.71
1894	55,132.21		
1895	50,535.61	Total	1,601,220.70
1896	59,629.08		

The above amounts represent the actual expenditures and in no case include the outstanding liabilities, which for the fiscal year 1908 amount to $9,676.72.

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CONTRACTS IN FORCE.

EMERGENCY CONTRACT DATED SEPTEMBER 17, 1907.

Name of contractor: Elk Cement and Lime Company, Petoskey, Mich.
Amount and character of work: One thousand seven hundred and twenty-one dollars and forty cents under this appropriation; furnishing and delivering Portland cement.
Price per unit: One dollar and fifty-one cents per barrel.
Date of expiration: December 8, 1907.
Date of completion: November 19, 1907.

EMERGENCY CONTRACT DATED OCTOBER 21, 1907.

Name of contractor: G. W. Gates & Co., Portland, Oreg.
Amount and character of work: Three thousand one hundred and sixty-three dollars and forty-six cents; furnishing and delivering fir timber.
Price per unit: Thirty-five dollars per thousand feet B. M., Lot I; $16 per thousand feet B. M., Lot II.
Date of expiration: November 30, 1907 (subject to delay obtaining cars).
Date of completion: January 25, 1908.

EMERGENCY CONTRACT DATED NOVEMBER 26, 1907.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: About $500 under this appropriation; time work by steam derrick boat, with diving plant, etc.
Price per unit: Six dollars and seventy-five cents per working hour; dynamite, 16 cents per pound.
Date of beginning of work: November 26, 1907.
Date of expiration: Indefinite.

EMERGENCY CONTRACT DATED JANUARY 23, 1908.

Name of contractor: The Soo Hardware Company, Sault Ste. Marie, Mich.
Amount and character of work: One thousand four hundred and fifty-nine dollars and two cents under this appropriation; furnishing iron and steel for new gates, Weitzel lock, etc.
Date of expiration: March 23, 1908.
Date of completion: March 23, 1908.

COMMERCIAL STATISTICS.

Statistical report of lake commerce through canals at Sault Ste. Marie, Michigan and Ontario, for the fiscal year ending June 30, 1908.

Items.	United States canal.	Canadian canal.	Total.
Vessel passages.....number..	11,715	5,645	17,360
Lockages.....do....	7,937	4,183	12,120
Net tonnage:			
Registered.....	25,742,484	9,614,741	35,357,175
Freight.....	33,964,074	12,467,146	46,431,220
Passengers.....number..	33,490	29,101	62,591
Coal:			
Hard.....net tons..	1,147,151	288,491	1,435,642
Soft.....do....	6,220,680	1,764,136	7,984,816
Flour.....barrels..	3,503,838	2,490,873	5,994,711
Wheat.....bushels..	42,182,616	48,378,958	90,561,574
Grain, other than wheat.....do....	18,321,491	18,255,142	36,576,633
Manufactured and pig iron.....net tons..	189,373	102,916	292,289
Salt.....barrels..	419,354	84,478	503,832
Copper.....net tons..	80,926	14,417	95,343
Iron ore.....do....	22,808,818	7,679,144	30,487,962
Lumber.....M feet B. M..	502,812	36,817	539,629
Building stone.....net tons..	678	220	898
General merchandise.....do....	506,954	427,039	933,993

NOTE.—The United States canal was open to navigation two hundred and twenty-nine days during the fiscal year. The Canadian canal was open to navigation two hundred and thirty-nine days during the fiscal year.

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Comparative statement of commerce through St. Marys Falls Canal, Michigan, for the fiscal years 1907 and 1908.

Items.	Fiscal year—		Increase.	Decrease.
	1907.	1908.		
Vessel passages.....number..	15,653	11,715	.....	3,938
Lockages.....do.....	9,925	7,937	.....	1,988
Net tonnage:				
Registered.....	33,716,538	25,742,434	.....	7,974,104
Freight.....	45,013,198	33,964,074	.....	11,049,124
Passengers.....number..	29,248	33,430	4,182	.....
Coal.....net tons..	8,326,943	7,367,831	.....	959,112
Flour.....barrels..	3,816,643	3,503,838	.....	312,805
Wheat.....bushels..	54,720,532	42,182,616	.....	12,537,916
Grain, other than wheat.....do....	30,139,877	18,321,491	.....	11,818,386
Manufactured and pig iron.....net tons..	277,877	189,373	.....	88,504
Salt.....barrels..	383,463	419,354	35,891	.....
Copper.....net tons..	85,976	80,926	.....	5,050
Iron ore.....t.....do....	31,688,607	22,808,818	.....	8,879,789
Lumber.....M feet B. M..	793,054	502,812	.....	290,242
Building stone.....net tons..	6,222	678	.....	5,544
General merchandise.....do....	498,651	506,954	8,303	.....

SUMMARY OF TRAFFIC THROUGH ST. MARYS FALLS CANAL, MICHIGAN, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

Number of vessels through Weitzel lock	3,926
Number of vessels through Poe lock	7,789
	11,715
Number of lockages through Weitzel lock	2,789
Number of lockages through Poe lock	5,148
	7,937
Total registered tonnage	25,742,434
Total freight tonnage	33,964,074

Total time spent in making lockages, three thousand seven hundred and eighty-seven hours and seventeen minutes.

Average time spent in making lockages, twenty-eight minutes and thirty-eight seconds.

Total time spent by vessels in passing locks, five thousand four hundred and twenty-four hours and twenty minutes.

Average time spent by vessels in passing locks, twenty-seven minutes and forty-seven seconds.

Cost per lockage	$13.92
Cost per passage	$9.43
Cost per registered ton.....mills..	4.29
Cost per freight ton.....do.....	3.25

The Weitzel lock was open to navigation one hundred and forty-nine days, from July 1 to November 26, 1907.

The time for the Poe lock was two hundred and twenty-nine days, July 1 to December 11, 1907, and from April 27 to June 30, 1908.

Compared with the previous fiscal year the commerce through St. Marys Falls Canal, Michigan, shows an increase in the following items: Passengers, 14 per cent; salt, 9 per cent, and general merchandise, 2 per cent. A decrease is shown in all other items, as follows: Passages, 25 per cent; lockages, 20 per cent; registered tonnage, 24 per cent; freight tonnage, 25 per cent; coal, 12 per cent; flour, 8 per cent; wheat, 23 per cent; grain other than wheat, 39 per cent; manufactured and pig iron, 32 per cent; copper, 6 per cent; iron ore, 28 per cent; lumber, 37 per cent, and building stone, 81 per cent.

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STATISTICS OF LAKE COMMERCE PASSING THROUGH THE AMERICAN AND CANADIAN CANALS AT SAULT STE. MARIE, MICHIGAN AND ONTARIO, DURING THE SEASON OF 1907.

[Compiled from official records at St. Marys Falls Canal, Michigan.]

SOURCES OF INFORMATION FOR TRAFFIC DATA AND VALUATIONS.

Freight tonnage and passengers.—The freight unit used and designated as a "net ton" means in every instance a ton of 2,000 pounds. The data relative to freight and passengers were compiled from reports made by vessel masters when passing through the American and Canadian canals. As a daily exchange of these reports is made with the Canadian canal, both offices have record of the entire lake traffic to and from Lake Superior.

Registered tonnage and vessel valuations.—The registered tonnage as given was obtained from vessel papers and blue books. Vessel valuations were obtained from Inland Lloyds.

Freight rates.—These were compiled from quotations published in the Marine Review, and from information obtained from shippers, owners, and carriers of the several classes of freight. The freight rates given are for lake transportation, and include cost of loading and unloading.

Freight valuations.—The unit values used for the various items of freight were derived by taking the mean for the season of each monthly average as obtained from daily or weekly prices current.

The sources of the valuations given are as follows: Coal, quotations in Coal Trade Journal at Duluth and Superior; cereals, Daily Commercial Record published by Duluth Board of Trade; flour, daily quotations in Duluth, Superior, and Minneapolis journals; iron ore and pig iron, weekly quotations in Iron Trade Review, Marine Review; salt, quotations at Lake Superior ports; copper, general merchandise, lumber, building stone, and manufactured iron, quotations by the principal shippers, owners, and carriers.

To quotations given at point of shipment freight rates are added to lake ports of destination.

The compilation was done by the clerical force in the United States canal office at Sault Ste. Marie, Mich., under the supervision of General Superintendent L. C. Sabin.

American and Canadian canals.—The total freight traffic of 58,217,214 net tons for the season of 1907, when compared with season of 1906, shows an increase of 12 per cent, or 6,466,134 tons, and the net registered tonnage of 44,087,974 shows an increase of 7 per cent, or 2,989,650.

The items showing an increase are coal, flour, wheat, and iron ore.

The total number of passengers was 62,758, a decrease of 275.

The passages through both canals numbered 20,437, showing a loss of 1,718, or 8 per cent.

The total lockages numbered 14,020, a loss of 503, or 3 per cent.

The season of navigation continued for a period of 7 months and 23 days, during which time the average monthly freight traffic was 7,338,305 net tons and 5,557,308 net registered tons.

The depth of water in entrance channels and through the canals and locks permitted a safe draft of 19½ feet.

American canal.—The traffic through the American canal was 73 per cent of the total freight, 73 per cent of the total net registered tonnage, and 52 per cent of the total number of passengers carried, the amounts being 42,631,846 tons of freight, 32,001,110 registered tons, and 32,875 passengers. Compared with the season of 1906 there was a decrease of 2,548,446 tons of freight, or 6 per cent, 2,788,683 registered tons, or 8 per cent, and an increase of 1,950 passengers, or 6 per cent.

The American canal opened April 23 and closed December 11, 1907, making the length of its season 233 days.

Canadian canal.—The traffic through the Canadian canal was 27 per cent of the total freight, 27 per cent of the total registered tonnage, and 48 per cent of the passengers carried, the amounts being 15,585,368 tons of freight, 12,086,864 registered tons, and 29,883 passengers. Compared with the season of 1906 there was an increase of 9,014,580 tons of freight, or 137 per cent, 5,778,333 registered tons, or 92 per cent, and a decrease of 2,225 passengers, or 7 per cent.

The Canadian canal was opened April 22 and closed December 15, 1907, making the length of its season 238 days.

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GENERAL SUMMARY.

[For American and Canadian canals together.]

Total freight carried, tons	58, 217, 214
Total net registered tons	44, 087, 974
Total mile-tons	48, 221, 465, 547
Total valuation placed on freight carried	$569, 830, 188
Total amount paid for freight transportation	$38, 457, 345
Total number of registered vessels using canals	879
Total number of passengers by unregistered crafts carrying freight	346
Total valuation placed on registered vessels	$110, 443, 500
Total number of passengers transported	62, 758
Average distance freight was carried, miles	828. 3
Average cost per ton for freight transportation	$0. 66
Average cost per mile per ton, mills	. 80
Average value per ton of freight carried	$9. 79
Time American canal was operated, days	233
Time Canadian canal was operated, days	238
Freight carried by—	
Registered vessels, tons	58, 186, 957
Unregistered vessels, tons	30, 257
American vessels, per cent	95
Canadian vessels, per cent	5
Passengers carried by—	
American vessels, per cent	43
Canadian vessels, per cent	57
Average number of vessels passing per day—	
Through Poe lock	36
Weitzel lock	26
Canadian lock	27
Poe, Weitzel, and Canadian locks	86

EAST AND WEST BOUND COMMERCE PASSING BOTH AMERICAN AND CANADIAN CANALS AT SAULT STE. MARIE, MICHIGAN AND ONTARIO, FOR THE SEASON OF 1907.

Articles.	United States canal.	Canadian canal.	Total.	Total net tons.
EASTBOUND.				
Copper.....net tons..	74, 302	15, 657	89, 959	89, 959
Grain.....bushels..	21, 039, 129	22, 422, 057	43, 461, 186	995, 051
Building stone.....net tons..	678	220	898	898
Flour.....barrels..	3, 406, 072	3, 118, 448	6, 524, 520	687, 102
Iron ore.....net tons..	29, 521, 033	10, 073, 911	39, 594, 944	39, 594, 944
Iron, pig.....do....	10, 170	10, 236	20, 406	20, 406
Lumber.....M feet B. M..	600, 714	48, 606	649, 320	1, 105, 811
Wheat.....bushels..	48, 842, 276	49, 293, 499	98, 135, 775	2, 944, 073
General merchandise.....net tons..	41, 668	64, 407	106, 075	106, 075
Passengers.....number..	14, 977	16, 733	31, 710	.....
WESTBOUND.				
Coal, hard.....net tons..	1, 261, 428	245, 240	1, 506, 668	1, 506, 668
Coal, soft.....do....	7, 636, 668	2, 256, 759	9, 893, 427	9, 893, 427
Flour.....barrels..	250	.....	250	25
Grain.....bushels..	1, 563	589	2, 152	35
Manufactured iron.....net tons..	193, 228	94, 307	287, 535	287, 535
Salt.....barrels..	389, 843	70, 959	460, 802	68, 626
General merchandise.....net tons..	483, 229	433, 350	916, 579	916, 579
Passengers.....number..	17, 898	13, 150	31, 048	.....
Freight:				
Eastbound.....net tons..	32, 998, 759	12, 545, 560	45, 544, 319	45, 544, 319
Westbound.....do....	9, 633, 087	3, 039, 808	12, 672, 895	12, 672, 895
Total freight.....do....	42, 631, 846	15, 585, 368	58, 217, 214	58, 217, 214
Vessel passages.....number..	14, 091	6, 346	20, 437	.....
Registered tonnage.....net..	32, 001, 110	12, 086, 864	44, 087, 974	44, 087, 974

NOTE.—In addition to the above traffic, 25,000 cords of pulp wood and 1,160,000 feet of logs passed down the rapids, bound for lower lake ports.

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Monthly registered and freight tonnage, season 1907.

Month.	Net registered tonnage of vessels.			Freight carried, net tons.		
	East-bound.	West-bound.	Total.	East-bound.	West-bound.	Total.
April	169,485	782,900	952,385	330,690	747,923	1,078,613
May	3,082,879	2,843,213	5,926,092	6,284,789	1,559,475	7,844,264
June	3,358,325	3,269,937	6,628,262	7,033,626	1,831,816	8,865,442
July	2,611,687	2,684,827	5,296,514	5,257,243	1,935,993	7,193,236
August	3,151,654	3,200,908	6,352,462	6,697,307	1,847,526	8,544,833
September	3,299,088	3,187,045	6,486,133	6,953,009	1,579,697	8,532,706
October	3,368,957	3,421,148	6,790,105	6,995,448	1,421,149	8,416,597
November	2,607,259	2,411,095	5,018,354	5,280,722	1,329,155	6,609,877
December	380,900	256,707	637,667	711,485	420,161	1,131,646
Total	22,030,294	22,057,680	44,087,974	45,544,319	12,672,895	58,217,214

INTERLAKE TRAFFIC.

Freight between Lake Superior and each of the other lakes.

[Classified with reference to American and Canadian vessels and ports.]

Freight carried by—	Ports.		Eastbound from Lake Superior to—				Total.
	From—	To—	Lake Michigan.	Lake Huron.	Lake Erie.	Lake Ontario.	
American vessels	American	American	4,558,102	195,196	38,463,262	52,849	43,269,409
Do	do	Canadian		41,442	9,742	106,008	157,192
Do	Canadian	American	8,916	6,401	275,348	4,295	294,960
Canadian vessels	do	Canadian		998,357	6,363	459,014	1,463,734
Do	do	American		26,295	200,356		226,651
Do	American	Canadian		90,054		42,319	132,373
Total eastbound			4,567,018	1,357,745	38,955,071	664,485	45,544,319
			Westbound to Lake Superior from—				
			Lake Michigan.	Lake Huron.	Lake Erie.	Lake Ontario.	
American vessels	American	American	64,253	48,855	10,272,766	22,353	10,408,227
Do	do	Canadian	7,464	7,231	1,323,871		1,338,566
Do	Canadian	American		1,110			1,110
Canadian vessels	do	Canadian		289,576	4,428	115,098	409,102
Do	do	American		14,419			14,419
Do	American	Canadian	46,689		447,922	6,860	501,471
Total westbound			118,406	361,191	12,048,987	144,311	12,672,895
Grand total			4,685,424	1,718,936	51,004,058	808,796	58,217,214

AMOUNT PAID FOR CARRYING FREIGHT.

Transportation charges, including loading and unloading, on freight passing through canals at Sault Ste. Marie, Michigan and Ontario, for the season of 1907.

Articles.	Quantity.	Rate per unit.	Amount.
Coal, net tons	11,400,095	$0.31	$3,534,029.45
Flour, barrels	6,524,770	.20	1,304,954.00
Wheat, bushels	98,135,775	.019	1,864,579.73
Grain, other than wheat, do	43,463,338	.019	825,803.42
Manufactured iron, net tons	287,535	1.80	517,563.00
Pig iron, do	20,406	1.50	30,609.00
Salt, barrels	460,802	.12	55,296.24
Copper, net tons	89,959	1.40	125,942.60
Iron ore, do	39,594,944	.67	26,528,612.48
Lumber, M feet B. M	649,320	2.50	1,623,300.00
Building stone, net tons	898	1.50	1,347.00
General merchandise, do	1,022,654	2.00	2,045,308.00
Total			38,457,344.92

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VALUE OF TOTAL FREIGHT CARRIED.

Estimated value of total freight passing the canals at Sault Ste. Marie, Michigan and Ontario, for the season of 1907.

Items.	Quantity.	Price per unit.	Valuation.	Per cent of total value.
Coal, anthracite.....net tons..	1,506,668	$5.80	$8,738,674	6.05
Coal, bituminous.....do....	9,893,427	2.60	25,722,910	
Flour.....barrels..	6,524,770	5.00	32,623,850	29.28
Wheat.....bushels..	98,135,775	1.00	98,135,775	
Grain other than wheat.....do....	43,463,338	.83	36,074,571	
Iron ore.....net tons..	39,594,944	3.75	148,481,040	26.06
Manufactured iron.....do....	287,535	80.00	23,002,800	4.12
Pig iron.....do....	20,406	23.25	474,440	
Copper (refined and concentrates).....do....	89,959	310.00	27,887,290	4.89
Lumber.....M feet B. M..	649,320	23.00	14,934,360	2.62
Salt.....barrels..	460,802	.75	345,602	
Silver ore.....net tons..	.....	.....	.....	26.98
Building stone.....do....	898	12.00	10,776	
General merchandise.....do....	1,022,654	150.00	153,398,100	
Total.....	.....	.....	569,830,188	100.00

THE VALUE OF GRAIN OTHER THAN WHEAT.

As given in the above table, is computed as follows:

Articles.	Bushels.	Price per unit.	Total value.
Rye.....	556,233	$0.752	$418,287.22
Oats.....	14,672,586	.431	6,323,884.57
Corn.....	354,893	.516	183,124.79
Barley.....	9,801,689	.781	7,655,119.11
Flax.....	18,077,937	1.200	21,693,524.40
Total.....	43,463,338	*.83	36,273,940.09

* Average.

VESSEL DIMENSIONS.

Classification of registered vessels as to length and beam over all.

[Nonfreight carriers: Tugs, yachts, etc.]

Length.	Beam.	Number of vessels. Years. 1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
Feet.	*Feet.*									
30 to 100.....	8 to 29.....	56	38	69	45	62	83	58	67	61
100 to 200.....	12 to 32.....	6	4	7	5	8	22	4	14	18
379.....	45.....	2	2	0	0	1	1	1	1	1

[Freight carriers.]

30 to 100.....	8 to 28.....	53	44	16	39	20	6	26	13	10
100 to 200.....	21 to 39.....	283	316	275	243	219	183	194	170	150
200 to 300.....	32 to 43.....	267	285	303	337	314	291	293	258	247
300 to 400.....	38 to 50.....	124	134	152	179	174	181	183	171	177
400 to 500.....	45 to 53.....	41	56	71	87	97	118	128	128	141
500 to 600.....	52 to 60.....	.....	.....	.....	.....	.....	1	23	57	70
600 and over.....	60 to 60-2 in....	.....	.....	.....	.....	.....	.....	.....	.....	4
Total.....	.....	832	879	893	935	895	886	910	879	879

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VESSEL CLASSIFICATION, VALUATION, ETC.

Classification of American and Canadian vessels, showing valuation and registered tonnage, and the freight and passengers carried through the canals at Sault Ste. Marie, Michigan and Ontario, during season of 1907.

AMERICAN VESSELS.

Class.	No.	Valuation.	Tonnage.		Passengers.
			Registered.	Freight.	
				Net tons.	
Steamers	618	$96,878,500	1,389,641	50,303,992	26,867
Sailing	143	5,647,000	184,926	5,153,898	.....
Unregistered	.....	.....	.....	11,574	.....
Total	761	102,525,500	1,574,567	55,469,464	26,867

CANADIAN VESSELS.

				Net tons.	
Steamers	109	$7,648,000	86,440	2,633,159	35,951
Sailing	9	270,000	7,784	95,908	.....
Unregistered	.....	.....	.....	18,683	.....
Total	118	7,918,000	94,224	2,747,750	35,951
Grand total	879	110,443,500	1,668,791	58,217,214	62,758

American vessels carried 95 per cent of the total freight and 43 per cent of the total passengers.

Canadian vessels carried 5 per cent of the total freight and 57 per cent of the total passengers.

Unregistered American craft carried 11,574 net tons of freight in 126 passages, or an average of 92 tons per passage.

Unregistered Canadian craft carried 18,683 net tons of freight in 220 passages, or an average of 85 tons per passage.

Of the 20,437 passages for the season, 2,743 were by 80 vessels under 100 tons register, with an average register of 35 tons. The total freight carried by such craft amounted to 1,813 net tons.

AVERAGE AND LIMITING DIMENSIONS OF VESSELS CLASSIFIED BY MAXIMUM FREIGHT CARGOES.

Freight tons in largest cargo.	Length.			Beam.			Draft.		
	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Less than 100	220.0	56.0	101.4	35.0	12.0	19.1	12.6	8.0	9.4
100 to 1,000	230.0	110.0	169.0	38.0	18.0	30.4	15.8	8.0	12.6
1,000 to 2,000	320.0	147.9	208.7	42.0	28.6	34.9	18.8	10.9	14.4
2,000 to 3,000	336.0	214.0	257.2	44.0	35.0	39.5	19.0	13.0	16.8
3,000 to 4,000	366.0	251.0	293.5	46.0	37.0	41.6	20.1	16.8	18.8
4,000 to 5,000	380.0	300.0	333.7	48.0	38.5	42.9	19.8	17.5	18.9
5,000 to 6,000	416.0	337.0	365.4	51.0	41.0	45.4	20.0	18.3	19.4
6,000 to 7,000	444.0	315.0	381.1	51.4	42.6	49.4	20.3	18.4	19.11
7,000 to 8,000	468.0	364.0	417.1	52.0	44.2	49.3	20.3	19.0	19.9
8,000 to 9,000	494.0	418.0	448.4	55.0	45.0	52.5	20.5	18.1	19.9
9,000 to 10,000	525.0	450.0	486.2	54.2	50.0	51.9	20.0	18.6	19.7
10,000 to 11,000	550.0	500.0	520.9	56.2	52.0	53.7	20.2	18.5	19.1
11,000 to 12,000	569.0	534.0	550.5	58.2	53.0	55.7	20.1	19.0	19.9
12,000 to 13,000	600.0	533.0	568.8	60.2	54.0	57.2	20.1	19.7	19.1
13,000 to 14,000	605.5	600.0	602.8	60.2	58.0	58.7	20.2	19.0	19.9

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Average and maximum dimensions of, and percentage of total freight carried by, vessels of different classes.

Class.	Number of boats of class using canal.	Aggregate registered tonnage.	Average registered tonnage.	Average length.	Maximum length.	Maximum beam.
Tons net register between—	*Number.*	*Tons.*	*Tons.*	*Feet.*	*Feet.*	*Feet.*
1 and 1,000	349	149,874	429	151	258	42
1,000 and 2,000	207	313,387	1,514	283	366	44
2,000 and 3,000	79	200,645	2,540	365	448	51
3,000 and 4,000	136	466,743	3,432	429	484	53
4,000 and 5,000	56	256,234	4,576	504	569	56
5,000 and 6,000	50	269,523	5,390	560	605	60
6,000 and over	2	12,385	6,193	605	605	60
Total	879	1,668,791				

Class.	Number of passages of vessels of class	Aggregate freight carried by vessels of class.	Average cargo.	Percentage of total freight carried by class.
Tons net register between—	*Number.*	*Net tons.*	*Net tons.*	
1 and 1,000	6,143	2,438,172	397	4.0
1,000 and 2,000	4,049	8,754,818	2,162	15.0
2,000 and 3,000	1,910	7,254,369	3,798	12.4
3,000 and 4,000	3,968	18,653,356	4,701	32.0
4,000 and 5,000	1,733	9,575,560	5,525	16.4
5,000 and 6,000	1,706	11,187,782	6,558	19.2
6,000 and over	39	322,900	8,280	1.0
Unregistered	889	30,257	34	
Total	20,437	58,217,214		100.0

Yearly statement of freight carried by steamers and sailing vessels.

Year.	Steamers.		Sailing.		Unregistered craft.		Total freight.	Percentage of freight carried by sailing vessels.a
	Number in commission.	Freight carried.	Number in commission.	Freight carried.	Number of passages.	Freight carried.		
		Net tons.		*Net tons.*		*Net tons.*	*Net tons.*	
1888	312	4,292,976	210	2,095,347	219	23,100	6,411,423	33
1889	345	5,175,799	231	2,304,538	443	35,685	7,516,022	31
1890	369	6,291,873	229	2,743,839	447	5,501	9,041,213	30
1891	396	6,420,939	256	2,456,091	447	11,729	8,888,759	28
1892	460	7,960,477	275	3,242,441	227	11,415	11,214,333	30
1893	459	7,723,153	294	3,034,084	213	39,335	10,796,572	28
1894	493	9,795,752	321	3,381,860	172	18,248	13,195,860	26
1895	522	10,581,474	355	4,464,671	232	16,635	15,062,580	30
1896	509	11,878,089	350	4,349,083	210	11,889	16,239,061	27
1897	525	13,163,667	323	5,790,326	377	28,762	18,982,755	31
1898	523	14,569,066	333	6,653,157	286	12,441	21,234,664	31
1899	542	17,801,213	290	7,423,311	366	31,286	25,255,810	29
1900	569	19,586,750	310	5,999,184	454	57,139	25,643,073	23
1901	598	21,186,571	295	7,166,694	413	49,800	28,403,065	25
1902	656	28,465,068	279	7,431,230	490	64,848	35,961,146	21
1903	652	28,042,546	243	6,594,304	361	37,587	34,674,437	19
1904	652	25,720,437	234	5,769,060	513	56,609	31,546,106	18
1905	692	37,724,522	218	6,479,506	729	66,652	44,270,680	15
1906	698	45,872,051	181	5,780,211	810	98,818	51,751,080	11
1907	727	52,937,151	152	5,249,306	346	30,257	58,217,214	9

a Sailing vessels include schooners, tow barges, and unrigged craft.

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Table showing yearly change in class of freighters as listed from their maximum freight cargoes.

NUMBER OF STEAMERS.

Year.	Net tons in maximum cargo between—											Total.
	1 and 1,000.	1,000 and 2,000.	2,000 and 3,000.	3,000 and 4,000.	4,000 and 5,000.	5,000 and 6,000.	6,000 and 7,000.	7,000 and 8,000.	8,000 and 10,000.	10,000 and 12,000.	12,000 and 14,000.	
1900	183	113	87	110	14	18	20	19	5			569
1901	164	118	88	124	17	26	26	31	4			598
1902	180	115	84	133	27	32	37	43	5			656
1903	173	104	71	136	24	37	42	52	13			652
1904	183	78	73	131	26	26	45	56	33	1		653
1905	164	96	80	130	31	19	40	55	57	17	3	692
1906	161	95	70	121	29	19	35	78	42	36	12	698
1907	158	90	61	115	27	16	43	47	93	55	22	727

NUMBER OF SAILING VESSELS.

1900	92	134	30	15	9	18	5	4	3			310
1901	86	117	24	25	13	15	7	2	6			295
1902	56	126	28	26	11	7	17	2	6			279
1903	39	115	18	26	12	4	21	2	6			243
1904	45	103	20	23	11	4	19	3	6			234
1905	39	94	21	18	13	3	17	5	8			218
1906	30	82	16	13	8	5	17	4	6			181
1907	34	65	10	10	7	4	15	5	2			152

STEAMERS AND SAILING VESSELS COMBINED.

1893	264	320	154	15								753
1894	265	339	192	18								814
1895	279	400	176	18	4							877
1896	281	335	168	43	21	11						859
1897	262	280	133	111	26	28	8					848
1898	273	266	116	118	26	34	18	5				856
1899	243	245	109	139	22	32	27	10	5			832
1900	275	247	117	125	23	36	25	23	8			879
1901	250	235	112	149	30	41	33	33	10			893
1902	236	241	112	159	38	39	54	45	11			935
1903	172	259	89	162	36	41	63	54	19			895
1904	228	181	93	154	37	30	64	59	39	1		886
1905	203	190	101	148	44	22	57	60	65	17	3	910
1906	191	177	86	134	37	24	52	82	48	36	12	879
1907	192	155	71	125	34	20	58	52	95	55	22	879

Forty-three new vessels were put in commission for the Lake Superior trade in 1907. They were all steamships for freight traffic. Twenty-five of these new vessels are 500 feet or more in length and carry from 9,000 to 13,800 net tons of freight in a single cargo.

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Yearly individual maximum records.

(A) STEAMERS.

Year.	Largest single cargo.	Greatest amount of freight carried.	Greatest number of miles run.	Greatest number of mile-tons.
1900	8,462	195,550	45,318	154,554,378
1901	8,222	161,375	41,370	132,822,226
1902	8,441	183,270	45,340	158,858,138
1903	8,914	164,763	45,330	158,843,973
1904	11,536	177,729	33,516	156,410,487
1905	12,368	274,401	41,374	249,038,482
1906	13,272	313,434	42,986	249,353,656
1907	13,800	339,151	43,296	274,863,249

(A) SAILS.

1900	8,206	149,031	30,947	124,399,966
1901	8,288	125,401	26,424	99,419,012
1902	8,485	150,258	32,033	119,437,488
1903	8,671	128,201	26,569	114,536,002
1904	8,736	117,365	24,158	106,643,498
1905	9,184	155,772	31,481	127,243,648
1906	8,960	141,770	31,575	126,745,992
1907	9,408	152,144	27,039	121,205,504

NAMES OF VESSELS MAKING ABOVE MAXIMUM RECORDS.

(a)				
1900	John W. Gates	Presque Isle	Troy	John W. Gates.
1901	Wm. Edenborn	do	Buffalo	John J. Albright.
1902	I. L. Elwood	Wm. Edenborn	Troy	Wm. Edenborn.
1903	Wm. Edenborn	John W. Gates	Buffalo	Bransford.
1904	Aug. B. Wolvin	Aug. B. Wolvin	Huronic	Aug. B. Wolvin.
1905	E. H. Gary	do	Duluth	Do.
1906	J. P. Morgan	E. H. Gary	E. H. Gary	E. H. Gary.
1907	do	J. P. Morgan	J. P. Morgan	Aug. B. Wolvin.
(b)				
1900	Madeira	Madeira	Madeira	Madeira.
1901	Manila	Marsala	Sir I. L. Bell	Do.
1902	John Smeaton	John Fritz	Alex. Holley	Marsala.
1903	Manila	Alex. Maitland	Barge No. 105	Alex. Maitland.
1904	John Smeaton	do	Maida	Do.
1905	do	Manila	Marcia	John Smeaton.
1906	do	Alex. Maitland	W. Le B. Jenney	Constitution.
1907	do	John Smeaton	John Smeaton	John Smeaton.

The maximum freight traffic for a single day was on August 26, when 487,649 tons passed through the canals. The vessel passages on this day numbered 121, the aggregate registered tonnage being 287,385.

DELAYS.

The American canal records show that vessels necessarily spent twenty-seven thousand and three hours and forty minutes in canal, or an average of two hours and nine minutes, which includes time waiting for lockage and passage through locks and canal, the latter being 1¾ miles long.

Other delays at canal, which included taking on supplies, waiting for daylight or favorable weather, amounted to six thousand five hundred and forty-four hours and twenty-one minutes.

Delays to vessels due to operating railway swing bridge amounted to twenty-five minutes.

Trains were delayed twenty-three hours and fifty-three minutes by passing boats temporarily preventing the closing of bridge.

The aggregate time the railway swing bridge was swung across the canal amounted to seven hundred and forty-seven hours and eight minutes, during which time 3,502 engines, 5,605 passenger cars, and 25,071 freight cars crossed the bridge.

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COMPARATIVE TRAFFIC—YEARS 1906 AND 1907.

Lake commerce through the canals at Sault Ste. Marie, Michigan and Ontario, for the seasons of 1906 and 1907.

Items.	Traffic for 1907.		Total traffic for—		Change.	
	United States canal.	Canadian canal.	Season 1907.	Season 1906.	Amount.	Per cent.
Vessel passages:						
Steamers.....number..	11,398	5,847	17,245	18,138	893	− 5
Sailing.....do....	2,084	219	2,303	2,817	514	−18
Unregistered.....do....	609	280	889	1,200	311	−26
Total.....do....	14,091	6,346	20,437	22,155	1,718	− 8
Lockages.....do....	9,428	4,592	14,020	14,523	503	− 3
Tonnage:						
Registered.....net..	32,001,110	12,086,864	44,087,974	41,098,324	2,989,650	+ 7
Freight.....do....	42,631,846	15,585,368	58,217,214	51,751,080	6,466,134	+12
Passengers.....number..	32,875	29,883	62,758	63,033	275	.....
Coal:						
Hard.....net tons..	1,261,428	245,240	1,506,668	1,011,375	495,293	+49
Soft.....do....	7,636,668	2,256,759	9,893,427	7,728,255	2,165,172	+28
Flour.....barrels..	3,406,322	3,118,448	6,524,770	6,495,350	29,420	.....
Wheat.....bushels..	48,842,276	49,293,499	98,135,775	84,271,358	13,864,417	+16
Grain, other than wheat.do....	21,040,692	22,422,646	43,463,338	54,343,155	10,879,817	−20
Manufactured and pig iron, net tons.....	203,398	104,543	307,941	391,105	83,164	−21
Salt.....barrels..	389,843	70,959	460,802	468,162	7,360	− 2
Copper.....net tons..	74,302	15,657	89,959	107,633	17,674	−16
Iron ore.....do....	29,521,033	10,073,911	39,594,944	35,357,042	4,237,902	+12
Lumber.....M feet B.M..	600,714	48,606	649,320	900,631	251,311	−28
Building stone.....net tons..	678	220	898	6,222	5,324	−86
General merchandise.....do....	524,897	497,757	1,022,654	1,134,851	112,197	−10

YEARLY SUMMARIES SINCE 1887.

Total freight, its valuation, freight charges, average haul or distance freight was carried and rate per ton per mile.

Year.	Total freight.	Valuation of freight.	Freight charges.	Average haul.	Freight charges per mile-ton.	Value of American craft.	Value of Canadian craft.
	Net tons.			*Miles.*	*Mills.*		
1887.....	5,494,649	$79,031,757	$10,075,153	811.4	2.3	$17,684,550	$2,089,400
1888.....	6,411,423	82,156,019	7,883,077	806.4	1.5	20,381,100	1,514,300
1889.....	7,516,022	83,732,527	8,634,246	790.4	1.5	25,328,600	1,597,600
1890.....	9,041,213	102,214,948	9,472,214	797.2	1.3	27,857,700	1,777,800
1891.....	8,888,759	128,178,208	9,849,022	820.4	1.35	31,947,300	2,119,500
1892.....	11,214,333	135,117,267	12,072,850	822.4	1.31	36,220,100	2,108,700
1893.....	10,796,572	145,436,957	9,957,483	831.9	1.1	39,017,400	2,115,700
1894.....	13,195,860	143,114,502	10,798,310	821.1	.99	41,124,300	1,959,800
1895.....	15,062,580	159,575,129	14,238,758	830.0	1.14	40,858,900	2,037,000
1896.....	16,239,061	195,146,842	13,511,615	836.4	.99	43,006,200	2,135,300
1897.....	18,982,755	218,235,927	13,220,099	841.3	.83	42,375,700	2,001,400
1898.....	21,234,664	233,069,740	14,125,896	842.6	.79	45,199,800	2,491,900
1899.....	25,255,810	281,361,750	21,959,707	827.2	1.05	65,000,520	3,369,600
1900.....	25,643,073	267,041,959	24,953,314	825.9	1.18	66,116,583	3,618,576
1901.....	28,403,065	289,906,865	23,217,974	823.3	.99	57,244,200	3,311,900
1902.....	35,961,146	358,306,300	26,566,189	827.4	.89	67,205,000	3,792,400
1903.....	34,674,437	349,405,014	26,727,735	835.6	.92	68,252,800	6,384,500
1904.....	31,546,106	334,502,686	21,552,894	843.5	.81	63,789,300	5,377,100
1905.....	44,270,680	416,965,484	31,420,585	833.3	.85	73,211,300	5,429,000
1906.....	51,751,080	537,463,454	36,666,889	842.4	.84	88,392,000	6,140,500
1907.....	58,217,214	569,830,188	38,457,345	828.3	.80	102,525,500	7,918,000

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Freight rates for water transportation to and from Lake Superior.

Year.	Coal.	Flour.	Wheat.	Grain (other than wheat).	Manufactured iron.	Pig iron.	Salt.
	Net tons.	*Barrels.*	*Bushels.*	*Bushels.*	*Net tons.*	*Net tons.*	*Barrels.*
1887	$0.90	$0.29	$0.07	$0.07	$2.35	$2.35	$0.18
1888	.70	.175	.035	.043	1.80	1.30	.16
1889	.47	.18	.04	.033	2.10	1.45	.18
1890	.45	.13	.03	.02	1.34	1.35	.15
1891	.43	.15	.046	.035	2.50	1.17	.18
1892	.41	.165	.036	.038	2.15	1.23	.15
1893	.40	.17	.028	.028	2.00	1.30	.12
1894	.40	.14	.025	.028	.90	1.15	.12
1895	.37	.14	.044	.045	1.50	1.05	.13
1896	.32	.11	.025	.023	1.40	1.05	.15
1897	.30	.10	.017	.02	1.40	1.05	.15
1898	.25	.10	.02	.02	1.40	1.05	.15
1899	.46	.13	.036	.036	1.70	1.50	.15
1900	.44	.12	.02	.02	2.00	1.50	.15
1901	.38	.12	.023	.022	2.00	1.50	.15
1902	.45	.12	.019	.019	2.00	1.50	.15
1903	.53	.12	.016	.016	2.00	1.50	.15
1904	.40	.13	.018	.018	2.00	1.50	.10
1905	.33	.14	.023	.023	2.00	1.50	.10
1906	.35	.18	.022	.022	2.00	1.50	.12
1907	.31	.20	.019	.019	1.80	1.50	.12

Year.	Copper.	Iron ore.	Lumber.	Silver ore.	Building stone.	General merchandise.
	Net tons.	*Net tons.*	*M ft. B. M.*	*Net tons.*	*Net tons.*	*Net tons.*
1887	$2.60	$1.75	$4.00	$3.00	$1.15	$4.00
1888	2.35	1.28	2.80	1.90	2.05	3.00
1889	2.25	1.14	2.70	1.90	2.02	3.00
1890	2.38	1.10	2.38	2.25	2.00	2.75
1891	2.00	.98	2.70	2.25	2.00	3.58
1892	1.40	1.00	2.95	2.25	1.67	3.60
1893	1.75	.80	2.35	2.25	1.36	3.00
1894	1.95	.70	1.90	2.25	1.28	2.75
1895	1.66	.82	2.00	2.33	1.20	2.50
1896	1.95	.82	1.80	2.33	1.50	2.30
1897	1.95	.65	1.55	2.33	1.50	2.30
1898	2.00	.60	1.65	.....	1.50	2.40
1899	2.00	.70	3.00	2.50	2.00	2.50
1900	1.60	1.05	2.30	2.00	1.50	2.00
1901	1.65	.78	2.55	.....	1.50	2.25
1902	1.40	.68	2.45	2.00	1.50	2.00
1903	1.43	.75	2.50	.....	1.50	2.00
1904	1.45	.63	2.55	2.00	1.50	2.00
1905	1.25	.68	2.45	2.00	1.50	2.00
1906	1.50	.67	2.70	.....	1.50	2.00
1907	1.40	.67	2.50	.....	1.50	2.00

Total freight valuations since 1887.

Year.	Coal (hard and soft).	Flour.	Wheat.	Grain (other than wheat).	Manufactured iron.	Pig iron.	Salt.
1887	$4,735,454	$7,863,675	$22,634,590	$759,653	$3,035,750	$241,468	$204,908
1888	7,367,644	10,953,625	18,224,424	1,981,862	2,442,950	252,348	210,433
1889	5,702,190	11,143,535	15,907,217	2,090,580	1,577,250	442,272	168,250
1890	7,619,238	16,195,520	15,893,022	2,003,496	4,680,750	386,104	179,431
1891	8,776,362	18,900,715	38,040,239	1,011,462	2,128,000	462,077	234,528
1892	10,164,931	21,672,540	30,746,085	933,346	2,988,600	709,716	275,740
1893	10,528,420	29,682,696	32,611,239	1,346,993	2,852,300	550,902	228,730
1894	8,191,917	33,621,649	22,316,469	772,504	1,805,350	331,452	237,461
1895	6,993,351	33,393,632	30,041,863	4,164,347	3,683,150	346,788	202,439
1896	8,452,073	34,199,003	47,442,347	10,704,748	4,696,200	377,298	178,136
1897	9,456,824	40,145,144	48,654,143	11,449,256	6,092,400	176,437	214,086
1898	10,334,461	33,056,683	49,871,997	13,039,192	10,709,350	476,775	226,170
1899	12,854,278	25,610,929	43,798,001	17,700,552	19,111,000	457,762	237,252
1900	14,620,840	27,042,752	28,342,511	14,071,953	11,551,000	351,313	328,895
1901	15,492,226	24,811,637	36,440,719	22,779,703	17,609,800	485,520	332,830
1902	16,570,398	31,185,840	55,246,295	25,521,556	20,323,390	277,925	288,149
1903	24,898,407	31,920,210	49,107,642	22,787,909	18,385,950	522,440	318,417
1904	19,657,221	25,907,959	52,425,313	23,121,694	18,512,600	672,885	255,821
1905	20,706,302	30,018,139	61,489,159	25,891,505	18,195,100	872,409	296,185
1906	25,136,044	27,280,470	67,417,086	38,583,640	29,614,880	387,002	351,121
1907	34,461,584	32,623,850	98,135,775	36,074,571	28,002,800	474,440	345,602

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Unit freight valuations since 1887.

Year.	Coal, anthracite.	Coal, bituminous.	Flour.	Wheat.	Grain (other than wheat).	Manufactured iron.	Pig iron.
	P. net ton.	*P. net ton.*	*Per bbl.*	*Per bush.*	*Per bush.*	*P. net ton.*	*P. net ton.*
1887	a 3.50	a $3.50	$5.00	$0.98	$0.98	$50.00	$17.00
1888	a 3.50	a 3.50	5.00	.98	.98	50.00	17.00
1889	a 3.50	a 3.50	5.00	.98	.98	50.00	17.00
1890	a 3.50	a 3.50	5.00	.98	.98	50.00	17.00
1891	a 3.50	a 3.50	5.00	.98	.98	50.00	17.00
1892	a 3.50	a 3.50	4.00	.75	.56	50.00	17.00
1893	a 3.50	a 3.50	4.00	.75	.56	50.00	17.00
1894	a 2.93	a 2.93	3.75	.64	.50	50.00	13.50
1895	4.25	2.40	3.75	.65	.50	50.00	13.00
1896	4.75	2.50	3.85	.75	.39	50.00	13.39
1897	5.50	2.60	4.50	.87	.46	50.00	13.25
1898	4.75	2.40	4.25	.80	.50	50.00	13.25
1899	5.70	2.60	3.60	.75	.59	100.00	19.50
1900	5.25	3.00	4.00	.70	.57	100.00	17.00
1901	5.60	2.90	3.25	.69	.92	100.00	16.00
1902	6.25	3.25	3.50	.72	.92	110.00	20.75
1903	5.80	3.15	4.50	.80	.71	110.00	20.00
1904	5.50	2.60	5.50	1.05	.70	100.00	15.00
1905	5.60	2.75	5.20	.90	.66	100.00	15.65
1906	5.75	2.50	4.20	.80	.71	80.00	15.00
1907	5.80	2.60	5.00	1.00	.83	80.00	22.25

a Average price for anthracite and bituminous coal combined.

Total freight valuations since 1887.

Year.	Copper.	Iron ore.	Lumber.	Silver ore and bullion.	Building stone.	General merchandise.	Total.
1887	$6,977,200	$8,741,995	$2,974,068	$53,826	$134,010	$20,675,160	$79,031,757
1888	5,792,000	8,996,908	4,326,696	520,579	335,410	20,751,240	82,156,019
1889	6,691,200	14,335,492	5,679,972	914,589	335,360	18,744,000	83,732,527
1890	8,745,800	16,711,088	6,514,722	527,807	479,730	22,277,640	102,214,948
1891	13,838,000	12,460,744	6,593,490	266,211	440,800	25,625,580	128,178,208
1892	12,998,400	17,153,962	9,231,192	296,815	396,960	27,548,760	135,117,267
1893	17,506,000	14,050,946	10,593,810	379,861	194,200	24,910,800	145,436,957
1894	19,914,400	17,027,078	11,564,608	46,144	214,170	27,071,100	143,114,502
1895	21,490,400	22,332,319	8,888,400	11,200	238,760	27,798,480	159,575,129
1896	23,374,400	25,705,062	8,562,925	26,880	177,310	31,251,000	165,146,842
1897	24,464,800	31,901,145	10,875,762	560	62,490	34,742,880	218,235,927
1898	29,814,240	35,120,880	12,984,532	.....	46,700	37,388,760	233,069,749
1899	38,428,800	52,116,016	17,646,969	60,875	468,756	52,873,560	281,364,758
1900	39,319,800	61,663,380	15,009,241	13,750	586,824	54,139,700	267,041,969
1901	26,227,866	58,794,509	16,617,922	.....	559,008	69,755,125	298,906,865
1902	22,916,280	75,200,420	17,736,404	125	467,028	92,512,500	358,306,300
1903	25,961,710	74,709,398	18,057,456	.....	255,000	82,479,875	349,405,014
1904	26,305,200	52,034,862	16,388,220	74,580	325,116	98,821,215	334,502,686
1905	30,358,200	93,997,911	17,885,911	2,255	130,788	117,121,620	416,965,484
1906	36,585,220	121,981,795	19,813,882	.....	74,064	170,227,650	537,463,454
1907	27,887,290	148,481,040	14,934,360	.....	10,776	153,398,100	569,530,188

Unit freight valuations since 1887.

Year.	Salt.	Copper.	Iron ore.	Lumber.	Silver ore.	Building stone.	General merchandise.
	Per bbl.	*P. net ton.*	*P. net ton.*	*Per M ft.*	*P. net ton.*	*P. net ton.*	*P. net ton.*
1887	$1.00	$200.00	$3.50	$18.00	$153.79	$10.00	$60.00
1888	1.00	200.00	3.50	18.00	153.79	10.00	60.00
1889	1.00	200.00	3.50	18.00	153.79	10.00	60.00
1890	1.00	200.00	3.50	18.00	153.79	10.00	60.00
1891	1.00	200.00	3.50	18.00	153.79	10.00	60.00
1892	1.00	200.00	3.50	18.00	153.79	10.00	60.00
1893	1.00	200.00	3.50	18.00	153.79	10.00	60.00
1894	1.00	200.00	2.60	16.00	112.00	10.00	60.00
1895	.75	200.00	2.77	12.00	112.00	10.00	60.00
1896	.75	200.00	3.25	12.50	112.00	10.00	60.00
1897	.75	200.00	3.00	13.50	112.00	10.00	60.00
1898	.75	240.00	3.00	14.50	.....	10.00	60.00
1899	.75	320.00	3.40	17.00	125.00	12.00	90.00
1900	1.00	300.00	3.75	16.50	125.00	12.00	100.00
1901	.75	266.00	3.25	15.50	.....	12.00	125.00
1902	.65	190.00	3.10	16.25	125.00	12.00	125.00
1903	.70	230.00	3.45	18.00	.....	12.00	125.00
1904	.70	240.00	2.65	17.75	55.00	12.00	135.00
1905	.70	285.00	3.00	18.50	55.00	12.00	140.00
1906	.75	340.00	3.45	22.00	.....	12.00	150.00
1907	.75	310.00	3.75	23.00	.....	12.00	150.00

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Statement of commerce through both American and Canadian canals at Sault Ste. Marie, Michigan and Ontario, for each year from first opening in 1855.

Season.			Class and tonnage of vessels.					Passenger and freight traffic.			
			Passages by—								
Year.	Date of opening canal.	Date of closing canal.	Steamers.	Sailing vessels.	Unregistered craft.	Total passages.	Net registered tonnage.	Passengers.	Coal.	Flour.	Wheat.
								No.	*Net tons.*	*Barrels.*	*Bushels.*
1855	June 18	Nov. 23	149	44	.....	193	106,296	8,295	1,414	10,289	.....
1856	May 4	Nov. 28	178	112	.....	290	101,458	7,992	3,968	17,686	.....
1857	May 9	Nov. 30	184	192	.....	376	180,820	6,650	5,298	18,515	.....
1858	Apr. 18	Nov. 20	224	182	.....	406	219,819	9,230	4,118	13,782	.....
1859	May 3	Nov. 28	258	411	.....	669	352,642	.....	8,884	39,459	74
1860	May 11	Nov. 26	337	579	.....	916	403,657	.....	.....	50,250	.....
1861	May 3	Nov. 14	296	242	.....	538	276,639	8,816	11,507	22,743	223
1862	Apr. 27	Nov. 27	295	543	.....	838	359,612	8,468	11,346	17,291	.....
1863	Apr. 28	Nov. 24	305	952	.....	1,257	507,434	18,281	7,805	31,975	.....
1864	May 2	Dec. 4	366	1,045	.....	1,411	571,438	16,985	11,282	33,937	.....
1865	May 1	Dec. 3	395	602	.....	997	409,062	19,777	.....	34,985	.....
1866	May 5	....do...	453	555	.....	1,008	458,530	14,067	19,915	33,603	.....
1867	May 4	....do...	466	839	.....	1,305	556,899	15,120	22,927	28,345	.....
1868	May 2	....do...	338	817	.....	1,155	432,563	10,590	25,814	27,372	.....
1869	May 4	Nov. 29	399	939	.....	1,338	524,885	17,657	27,850	32,007	.....
1870	Apr. 29	Dec. 1	431	1,397	.....	1,828	690,826	17,153	15,952	33,548	49,700
1871	May 8	Nov. 29	573	1,064	.....	1,637	752,101	15,859	46,798	26,040	1,376,705
1872	May 11	Nov. 26	792	1,212	.....	2,004	914,735	25,830	80,815	136,411	567,134
1873	May 5	Nov. 18	968	1,519	.....	2,517	1,204,446	30,966	96,780	172,692	2,119,997
1874	May 12	Dec. 2	901	833	.....	1,734	1,070,857	22,958	61,124	179,855	1,120,015
1875	....do...	....do...	1,464	569	.....	2,033	1,259,534	19,685	101,260	309,991	1,213,788
1876	May 8	Nov. 26	1,733	684	.....	2,417	1,541,676	20,286	124,960	390,577	1,971,549
1877	May 2	Nov. 30	1,050	1,401	.....	2,451	1,439,216	21,800	91,575	355,117	1,349,738
1878	Apr. 8	Dec. 3	1,476	1,091	.....	2,567	1,667,136	20,394	91,856	344,599	1,872,940
1879	May 2	....do...	1,618	1,403	100	3,121	1,677,071	18,979	110,704	451,154	2,603,666
1880	Apr. 28	Nov. 15	1,735	1,718	50	3,503	1,734,890	25,766	170,501	523,860	2,105,920
1881	May 7	Dec. 5	2,117	1,706	181	4,004	2,092,757	24,671	295,647	605,453	3,456,965
1882	Apr. 21	Dec. 3	2,739	1,663	372	4,774	2,468,088	29,256	430,184	344,044	3,728,856
1883	May 2	Dec. 11	2,620	1,458	237	4,315	2,042,259	39,130	714,444	687,031	5,900,473
1884	Apr. 23	Dec. 10	3,609	1,709	371	5,689	2,997,837	54,214	706,379	1,248,243	11,985,791
1885	May 6	Dec. 2	3,354	1,689	337	5,380	3,035,937	36,147	894,991	1,440,093	15,274,213
1886	Apr. 25	Dec. 4	4,584	2,534	306	7,424	4,219,397	27,088	1,009,999	1,759,365	18,991,485
1887	May 1	Dec. 2	5,968	2,562	825	9,355	4,897,598	32,668	1,352,987	1,572,735	23,096,520
1888	May 7	Dec. 4	5,305	2,009	489	7,803	5,130,659	25,558	2,105,041	2,190,725	18,596,351
1889	Apr. 15	....do...	6,501	2,635	443	9,579	7,221,935	25,712	1,629,197	2,228,707	16,231,854
1890	Apr. 20	Dec. 3	7,268	2,872	417	10,557	8,454,435	24,856	2,176,925	3,239,104	16,217,370
1891	Apr. 27	Dec. 7	7,339	2,405	447	10,191	8,400,685	26,190	2,507,532	3,780,143	38,816,570
1892	Apr. 18	Dec. 6	8,737	3,324	519	12,580	10,647,203	25,896	2,904,266	5,418,135	40,994,780
1893	May 1	Dec. 5	8,379	2,955	674	12,008	8,949,754	18,869	3,008,120	7,420,674	43,481,652
1894	Apr. 17	Dec. 6	10,208	3,676	607	14,491	13,110,366	27,236	2,797,184	8,965,773	34,869,483
1895	Apr. 25	Dec. 11	12,495	4,790	671	17,956	16,806,781	31,656	2,574,362	8,902,302	46,218,250
1896	Apr. 21	Dec. 8	13,404	4,391	820	18,615	17,249,418	37,066	3,023,340	8,882,858	63,256,463
1897	....do...	Dec. 14	12,029	4,438	704	17,171	17,619,933	40,213	3,039,172	8,921,143	55,924,302
1898	Apr. 11	....do...	12,461	4,449	851	17,761	18,622,754	43,426	3,776,450	7,778,043	62,339,996
1899	Apr. 26	Dec. 20	14,378	4,776	1,101	20,255	21,958,347	49,082	3,940,887	7,114,147	58,397,335
1900	Apr. 19	Dec. 16	14,426	4,004	1,022	19,452	22,315,834	58,555	4,486,977	6,760,688	40,489,302
1901	Apr. 20	Dec. 21	14,372	4,482	1,187	20,041	24,626,976	59,663	4,593,136	7,634,350	52,812,636
1902	Apr. 1	Dec. 20	17,069	4,368	1,222	22,659	31,955,582	59,377	4,812,478	8,910,240	76,730,965
1903	Apr. 2	Dec. 15	14,027	3,569	1,000	18,596	27,736,444	55,175	6,937,633	7,093,380	61,384,552
1904	Apr. 30	Dec. 26	12,188	2,994	938	16,120	24,364,138	37,695	6,454,869	4,710,538	49,928,869
1905	Apr. 10	Dec. 20	17,197	3,263	1,219	21,679	36,617,699	54,204	6,509,056	5,772,719	68,321,288
1906	Apr. 13	Dec. 22	18,138	2,817	1,200	22,155	41,098,324	63,033	8,739,630	6,495,350	84,271,358
1907	Apr. 22	Dec. 15	17,245	2,303	889	20,437	44,087,974	62,758	11,400,095	6,524,770	98,135,775

St. Marys Falls Canal, Michigan, State lock, 1855 to 1887.
St. Marys Falls Canal, Michigan, Weitzel lock, since September 1, 1881.

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Statement of commerce through both American and Canadian canals at Sault Ste. Marie, Michigan and Ontario, for each year from first opening in 1855.

Year.	Passenger and freight traffic.									
	Grain, other than wheat.	Manufactured and pig iron.	Salt.	Copper.	Iron ore.	Lumber.	Silver ore and bullion.	Building stone.	General merchandise.	Total freight.
	Bushels.	*Net tons.*	*Barrels.*	*Net tons.*	*Net tons.*	*M feet B. M.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*
1855	.....	1,445	196	3,196	1,447	127	.....	.....	5,690	14,501
1856	82,060	2,272	1,027	5,977	11,597	433	.....	.....	5,538	33,817
1857	40,637	4,426	1,118	4,400	26,185	680	.....	.....	7,140	51,607
1858	21,000	3,031	1,223	6,944	31,035	188	.....	.....	9,587	57,008
1859	71,738	7,172	2,737	7,269	65,769	766	.....	.....	25,280	122,056
1860	133,437	1,446	.....	9,000	120,000	.....	.....	.....	14,915	158,721
1861	76,830	4,904	3,014	7,645	44,837	664	.....	.....	12,972	87,847
1862	59,062	7,023	2,477	6,881	113,014	240	.....	.....	19,355	161,675
1863	78,480	7,939	1,506	1,044	181,567	1,414	.....	.....	30,213	236,780
1864	143,560	9,234	1,776	5,331	213,753	2,012	.....	.....	33,477	284,350
1865	.....	7,400	3,175	9,935	147,459	822	.....	.....	11,236	181,638
1866	229,926	14,484	4,454	9,550	152,102	660	.....	.....	32,310	239,457
1867	249,031	23,141	5,316	10,585	222,861	1,177	.....	.....	33,632	325,357
1868	285,123	23,991	4,624	12,222	191,939	1,404	.....	.....	31,843	299,175
1869	323,501	25,604	5,910	18,662	239,368	1,423	.....	.....	41,813	368,326
1870	304,077	42,049	11,089	11,301	409,850	814	92	4,560	40,342	539,883
1871	308,823	57,216	36,199	14,562	327,461	1,098	464	5,528	74,227	585,583
1872	445,774	100,293	42,690	14,986	383,105	1,853	306	5,213	109,663	746,256
1873	309,645	47,996	29,335	15,947	504,121	2,191	580	2,218	123,398	888,432
1874	149,999	33,713	44,231	15,345	427,658	686	443	401	55,312	655,138
1875	272,580	56,649	43,989	18,396	493,408	4,498	847	2,978	70,128	833,466
1876	424,468	67,409	46,666	25,756	609,752	17,820	985	2,102	91,119	1,073,570
1877	378,063	42,705	63,188	16,767	568,082	15,373	1,020	2,506	64,201	912,639
1878	264,674	18,116	63,520	22,529	555,750	34,889	768	2,754	69,007	937,351
1879	973,948	43,771	92,245	22,309	540,075	43,439	324	2,226	81,279	1,050,784
1880	2,553,436	54,302	77,916	21,753	677,073	48,635	66	2,283	100,849	1,321,906
1881	367,838	87,830	65,897	29,488	748,131	58,877	.....	1,400	129,031	1,567,741
1882	473,129	92,870	176,612	25,409	987,060	82,783	22	5,428	172,167	2,029,521
1883	776,552	109,910	70,898	31,024	791,732	87,131	814	2,405	191,571	2,267,105
1884	517,103	72,428	144,804	36,062	1,136,071	122,389	9,731	6,047	207,173	2,874,557
1885	422,981	60,842	136,355	31,927	1,235,122	127,984	3,669	8,189	184,963	3,256,623
1886	715,373	115,208	158,677	38,627	2,087,809	138,688	2,009	9,449	230,726	4,527,759
1887	775,166	74,919	204,908	34,886	2,497,713	165,226	350	13,401	344,586	5,494,649
1888	2,022,308	63,703	210,433	28,960	2,570,517	240,372	3,385	33,541	345,854	6,411,423
1889	2,133,245	57,561	168,250	33,456	4,095,855	315,554	5,947	33,538	312,410	7,516,022
1890	2,044,384	116,327	179,431	43,729	4,774,768	361,929	3,432	47,973	371,294	9,041,213
1891	1,032,104	69,741	234,528	69,190	3,560,213	366,305	1,731	44,080	417,093	8,888,758
1892	1,666,690	101,520	275,740	64,993	4,901,132	512,844	1,930	39,698	459,146	11,214,333
1893	2,405,344	89,452	228,730	87,530	4,014,556	588,545	2,470	19,426	415,180	10,796,573
1894	1,545,008	60,659	237,461	99,573	6,548,876	722,788	412	21,417	451,185	13,195,866
1895	8,328,694	100,337	269,919	107,452	8,062,209	740,700	100	23,876	463,308	15,062,580
1896	27,448,071	121,872	237,515	116,872	7,909,250	684,986	240	17,731	520,851	16,239,061
1897	24,889,688	135,164	285,449	122,324	10,633,715	805,612	5	6,249	579,048	18,982,758
1898	26,078,384	250,170	301,560	124,226	11,706,960	895,485	.....	4,670	623,146	21,234,664
1899	30,000,935	214,585	316,336	120,090	15,328,240	1,038,057	487	39,063	587,484	25,255,810
1900	16,174,659	135,585	328,895	131,066	16,443,568	909,651	110	48,902	541,397	25,643,073
1901	24,760,547	206,443	443,774	98,601	18,090,618	1,072,124	.....	46,584	558,041	28,403,065
1902	27,740,822	198,152	443,306	120,612	24,277,555	1,091,471	1	38,919	740,100	35,961,146
1903	32,095,646	193,267	454,882	112,877	21,654,898	1,003,192	.....	21,300	659,839	34,674,433
1904	33,030,992	229,985	365,459	109,605	19,635,797	923,280	1,356	27,093	732,009	31,546,106
1905	39,229,553	237,696	423,122	106,520	31,332,637	966,806	41	10,899	836,583	44,270,680
1906	54,343,155	391,105	468,162	107,633	35,357,042	900,631	.....	6,222	1,134,851	51,751,089
1907	43,463,338	307,941	460,802	89,959	39,594,944	649,320	.....	898	1,022,654	58,217,214

St. Marys Falls Canal, Michigan, Poe lock, since August 3, 1896.
Sault Ste. Marie Canal, Ontario, Canadian lock, since September 9, 1895.

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Lockage data, St. Marys Falls Canal, Michigan.

Date.	Weitzel lock.			Poe lock.			Average time of passage of canal 1⅝ miles long, including lockage.	
	Number of lockages.	Average time of lockage.	Number of ships.	Number of lockages.	Average time of lockage.	Number of ships.	Actual.	Necessary.
		m. s.			m. s.		h. m.	h. m.
1887	4,165	38 47	9,355					
1888	3,845	39 09	7,803					
1889	4,684	40 03	9,579					
1890	4,970	41 40	10,557				4 34	2 54
1891	4,981	41 11	10,191				4 17	2 50
1892	5,867	42 13	12,580				5 02	3 49
1893	5,553	40 40	12,008				4 13	3 15
1894	6,431	40 12	14,491				4 36	4 08
1895	7,039	39 06	16,793				5 46	4 58
1896	5,462	36 35	11,035	961	56 45	2,406	2 45	2 09
1897	1,577	38 59	2,677	4,390	43 14	10,135	2 16	1 42
1898	2,682	33 30	4,513	4,326	43 05	9,545	2 13	1 14
1899	4,007	32 05	6,935	4,382	46 58	9,545	2 19	1 14
1900	4,153	20 43	7,093	4,326	34 21	9,276	2 11	1 10
1901	4,074	24 22	7,004	4,337	36 02	8,833	2 41	1 34
1902	4,149	22 09	6,469	5,278	37 58	11,119	2 37	1 29
1903	3,467	20 37	5,173	4,928	34 45	9,070	2 21	1 24
1904	3,219	22 43	4,747	4,074	34 30	7,406	2 18	1 23
1905	4,469	22 57	6,561	5,288	35 15	9,458	2 11	1 39
1906	4,522	22 59	6,507	5,845	34 31	9,968	2 33	1 48
1907	3,941	23 29	5,616	5,487	35 09	8,475	2 40	2 09
Summation.	93,257	33 27	177,687	53,622	37 57	105,236	3 09	2 14

Average time of lockage through the Canadian lock, fifteen minutes.
A single steamer has been locked through the Weitzel lock in ten minutes.
A single steamer has been locked through the Poe lock in eleven minutes.
A single steamer has been locked through the Canadian lock in eight minutes.
The average time of passage per ship has been one to six minutes less than the average time of lockage.

Maximum number of lockages in a day.

WEITZEL LOCK.

Date.	Number of lockages.	Number of ships.	Registered tonnage.	Freight tonnage.
			Net tons.	*Net tons.*
July 19, 1895	41	100	79,197	58,807
July 28, 1895	41	85	89,574	88,298
July 9, 1896	41	81	68,324	54,813

POE LOCK.

May 15, 1899	35	93	118,601	75,747

CANADIAN LOCK.

June 24, 1905	34	52	45,144	36,116
June 6, 1907	34	56	90,525	96,827

Maximum freight for a day.

WEITZEL LOCK.

Date.	Number of lockages.	Number of ships.	Registered tonnage.	Freight tonnage.
			Net tons.	*Net tons.*
September 9, 1895	31	98	85,192	105,542

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Maximum freight for a day—Continued.

POE LOCK.

Date.	Number of lockages.	Number of ships.	Registered tonnage.	Freight tonnage.
			Net tons.	*Net tons.*
September 2, 1907	28	49	160,179	295,562

CANADIAN LOCK.

November 6, 1906	27	51	130,477	228,388

Comparative statement of traffic through Poe, Weitzel, and Canadian locks since the opening of the Canadian canal in 1895.

POE LOCK.

[Opened August 3, 1896.]

Year.	Passages.	Lockages.	Registered tonnage.	Freight tonnage.	Passengers.
1896	2,401	961	2,992,200	3,489,448	3,695
1897	10,135	4,390	12,120,867	13,058,291	15,178
1898	9,545	4,326	13,224,816	16,664,519	11,112
1899	9,545	4,382	14,844,888	19,924,822	9,183
1900	9,276	4,326	15,632,102	21,548,949	12,126
1901	8,833	4,337	16,916,836	23,250,661	6,513
1902	11,119	5,278	22,260,719	29,735,671	10,792
1903	9,070	4,928	18,841,962	27,790,831	13,909
1904	7,406	4,074	15,882,986	24,640,923	8,355
1905	9,458	5,288	24,176,472	36,543,484	12,703
1906	9,968	5,845	28,138,888	43,083,490	14,202
1907	8,475	5,487	26,160,107	40,859,145	17,036

WEITZEL LOCK.

1895	16,793	7,039	16,089,878	14,471,648	20,910
1896	11,040	5,462	9,904,788	8,189,576	18,743
1897	2,677	1,577	1,702,969	981,335	13,527
1898	4,513	2,682	2,646,793	1,519,632	16,446
1899	6,935	4,007	4,176,601	2,327,317	24,452
1900	7,093	4,153	4,504,680	2,056,405	24,138
1901	7,004	4,074	5,305,498	2,331,377	23,188
1902	6,469	4,149	5,147,302	1,497,124	11,986
1903	5,173	3,467	4,156,902	1,381,421	9,259
1904	4,747	3,219	4,277,056	1,876,993	13,251
1905	6,561	4,469	6,944,761	2,258,706	15,628
1906	6,507	4,522	6,650,905	2,096,802	16,728
1907	5,616	3,941	5,841,003	1,772,701	15,849

CANADIAN LOCK.

[Opened September 9, 1896.]

1895	1,163	695	716,903	590,932	746
1896	5,174	3,043	4,352,430	4,560,037	14,626
1897	4,359	2,604	3,796,097	4,943,129	11,398
1898	3,703	2,525	2,751,145	3,050,513	15,866
1899	3,775	2,610	2,936,858	3,003,671	15,413
1900	3,063	2,206	2,179,052	2,035,719	22,362
1901	4,204	2,910	2,404,642	2,821,027	29,957
1902	5,071	3,419	4,547,561	4,728,351	26,580
1903	4,353	3,247	4,737,580	5,502,185	32,019
1904	3,967	3,022	4,204,096	5,028,190	16,630
1905	5,660	4,035	5,496,466	5,468,490	25,888
1906	5,680	4,156	6,308,531	6,570,788	32,108
1907	6,346	4,592	12,086,864	15,585,368	20,883

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Monthly averages from daily readings.

DEPTH OF WATER IN POE LOCK.

Year.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1896					20.48	20.34	19.88	19.78	19.69
1897	19.36	19.82	20.22	20.63	20.80	20.60	20.31	19.99	19.77
1898	19.33	19.61	19.99	20.35	20.39	20.30	20.10	19.96	19.89
1899	20.01	19.94	20.47	20.84	20.98	21.01	20.70	20.44	20.37
1900	19.82	19.70	19.80	20.18	20.52	20.94	21.02	20.86	20.59
1901	20.11	19.96	20.20	20.39	20.60	20.17	20.08	19.72	19.42
1902	18.76	19.09	19.31	19.74	19.86	19.80	19.47	19.41	19.16
1903	18.95	19.33	19.55	19.84	19.97	20.08	20.01	19.71	20.31
1904	20.08	19.93	20.46	20.62	20.70	20.77	20.77	20.43	20.29
1905	19.89	20.04	20.29	20.70	20.75	20.78	20.72	20.43	20.14
1906	20.17	20.25	20.53	20.68	20.68	20.54	20.32	20.12	20.17
1907	19.90	19.85	20.25	20.49	20.70	20.84	20.43	19.97	19.55

Saw logs and pulp wood rafted down St. Marys Rapids.

Year.	Number of rafts.	Saw logs.	Number of rafts.	Pulp wood.
		M feet. B. M.		*Cords.*
1885	7	13,000	.....	.....
1886	15	21,000	.....	.....
1887	17	31,950	.....	.....
1888	a17	29,450	.....	.....
1889	5	9,000	.....	.....
1890	11	20,450	.....	.....
1891	12	25,800	.....	.....
1892	22	39,500	.....	.....
1893	16	29,100	1	500
1894	6	18,586	.....	.....
1895	2	4,500	.....	.....
1896	a3	2,200	.....	.....
1897	2	4,500	.....	.....
1898	2	3,000	2	3,700
1899	1	2,000	6	15,000
1900	5	8,500	5	15,500
1901	4	9,000	5	10,100
1902	2	5,000	5	6,500
1903	.....	.....	.....	.....
1904	.....	.....	5	19,500
1905	3	1,300	6	16,000
1906	1	1,179	4	13,500
1907	1	1,160	9	25,000

a Includes one raft, the number of feet it contained not being known.

GROWTH OF LAKE SUPERIOR COMMERCE.

The movement of freight to and from Lake Superior previous to the opening of the State Canal in 1855 was entirely by boat to Sault Ste. Marie, where the cargoes were unloaded, then taken across the portage 1 mile long and reloaded aboard boats.

In 1851 about 12,600 tons passed over the tramway portage; the transshipments to Lake Superior ports comprised the articles—hay, oats, dry goods, groceries, and mining machinery, to the value of $1,000,000, and those to lower lake ports included copper, iron blooms, and fish, valued at $675,000.

During the fifty-three years the canal has been in commission the yearly traffic has increased from a minimum of 14,503 tons to a maximum of 58,217,214 tons.

The increase in tonnage of each year's traffic over that of the preceding year has averaged about 20 per cent. For each decade the average percentage of yearly increase and the total tonnage are as follows:

	Tons.
1855–1864, 44 per cent	1,203,358
1865–1874, 12 per cent	4,829,247
1875–1884, 17 per cent	14,868,639
1885–1894, 17 per cent	80,343,218
1895–1904, 12 per cent	253,002,697
1905	44,270,680
1906	51,751,080
1907	58,217,214
Total	508,486,133

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HISTORICAL NOTES.

The St. Marys Rapids are about half a mile wide and three-fourths of a mile long. The fall ranges from 16½ to 20½ feet with the varying stages of water.

The first canal was built on the Canadian side of the river by the Northwest Fur Company in 1797–98. The lock was 38 feet long, 8 feet 9 inches wide, with a lift of 9 feet. A towpath was made along the shore for oxen to track the bateaux and canoes through the upper part of the rapids. The lock, excepting its timber floor and miter sills, was destroyed in 1814 by United States troops from Mackinac Island under command of Major Holmes.

The first ship canal, known as the State Canal, was built on the American side of the river in 1853 to 1855, some 750,000 acres of land in Michigan having been granted by the United States Congress for the construction thereof. The canal was 1¼ miles long, 64 feet wide at bottom, 100 feet wide at water surface, and 13 feet deep. There were two tandem locks of masonry, each 350 by 70 feet, having 11½ feet of water on the miter sills and a lift of about 9 feet each. Capt. A. Canfield, topographical engineers, U. S. Army, made the original surveys. Charles T. Harvey was superintendent of construction and the St. Marys Falls Ship Canal Company was the contractor. The locks were destroyed in 1888 by excavations for the present Poe Lock.

The Weitzel Lock, 515 feet long, 80 feet wide in chamber, narrowing to 60 feet at the gates, with 17 feet depth of water on the miter sills when the upper pool is 601.9 feet and the lower pool 584.4 feet above mean tide at New York, was built by the United States in the years 1870 to 1881. During the same period the depth of the canal was increased to 16 feet. the mean width to 160 feet, and the stone slope walls were replaced with timber piers having a vertical face. Gen. Orlando M. Poe was the engineer officer in charge of the district from 1870 to 1873, and Gen. Godfrey Weitzel from 1873 to 1882. Alfred Noble was the assistant engineer in local charge from 1870 to 1882. Boyle & Roach were the principal contractors.

The Canadian canal, 1½ miles long, 150 feet wide, and 22 feet deep, with lock 900 feet long and 60 feet wide, having 22 feet of water on the miter sills, was built on the north side of the river in the years 1888 to 1895. Hon. Collingwood Schreiber was chief engineer of Dominion canals, etc., and W. G. McNeill Thompson was the government engineer in local charge of construction work. Ryan & Haney were the contractors.

The Poe lock, 800 feet long, 100 feet wide, and having 22 feet of water on the sills, was built by the United States in the years 1887 to 1896. Gen. Orlando M. Poe was the engineer officer in charge of the district from 1883 to 1895, and E. S. Wheeler the assistant engineer in local charge of construction work from 1882 to 1897. Hughes Bros. & Bangs were the principal contractors.

The American canal since 1892 has been deepened to 25 feet, and its entrance piers have been extended so that its total length at the falls is now 1¾ miles. Its width is variable, being 500 feet at the upper entrance, 108 feet at the canal gate, 270 feet at the basin above locks, and 1,000 feet at the lower entrance. Dunbar & Sullivan and J. B. Donnelly were the principal contractors.

The canal also practically includes those parts of the channels through St. Marys River, which have been improved through shoals of sand, clay, bowlders, sandstone, and limestone rock. The United States Government made the first appropriation for improving the river channels in 1856. The Lake George route was improved for 12 feet draft, 1857 to 1860 and 1866 to 1869. The depth was increased to 16 feet, 1879 to 1883. The Hay Lake route was improved for a depth of 20 feet at mean stage of water, years 1882 to 1894. Betterment of the channels has been continued every year since, so that the dredged areas now total 34 miles in length with least width of 300 feet, increasing at angles and other critical places up to 1,000 feet. In 1903 excavation of channels was begun for 21 feet at lowest stage of water.

The engineer officers in past charge of the river improvements were Capt. A. W. Whipple, 1858–1861; Col. T. J. Cram, 1866–1870; Maj. O. M. Poe, 1870–1873; Col. G. Weitzel, 1873–1882; Maj. F. U. Farquhar, 1882–83; Col. O. M. Poe, 1883–1895; Col. G. J. Lydecker, 1896–1902; Maj. W. H. Bixby, 1902–1904, and Col. Chas. E. L. B. Davis, 1904–1908. J. Hickler & Sons, C. F. and H. T. Dunbar, and Carkin, Stickney & Cram were the principal contractors.

The cost of the several improvements, stated in round numbers, is as follows:

Locks and canal of 1855	$1,000,000
Weitzel lock	1,000,000
Poe lock	3,000,000
Widening and deepening canal	3,000,000
Improving channel through river	7,000,000
Canadian lock, canal and approaches	5,000,000

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Hydraulic power is used for operating the American locks, a pressure of 115 pounds per square inch being used for the Weitzel lock machinery and a pressure of 200 pounds for the Poe lock machinery. Electricity generated by water power is used for operating the Canadian lock.

The Poe lock can be filled or emptied in about seven minutes and the gates opened or closed in two minutes. The Weitzel lock can be operated in about the same time as the Poe lock. The Canadian lock can be operated in about eight minutes. An uplockage of a single boat 350 feet long has been made through the Poe lock in eleven minutes, but the average time spent in making a lockage last season was thirty-five minutes, this difference being due to the slow movement of boats while entering and leaving the locks and to the fact that in nearly half of the lockages more than one boat was passed. Frequently as many as five boats were included in a single lockage. The average time of lockage through the Canadian lock was about seventeen minutes.

From 1855 to 1881 the canal was controlled by the State of Michigan and tolls were charged to cover operating and repair expenses, the rate at first being 6½ cents per registered ton, which was gradually reduced to 2½ cents. Similarly the minimum charge for lockage of a boat was reduced from $5 to $3. Since control was transferred to the United States in 1881, the American canal has been free for public use by all nations. Likewise the Canadian canal has not collected tolls for either foreign or domestic commerce.

The lock force under State control consisted of about 20 men, having one watch only, as night navigation of the river was then impossible. Under United States control two watches, of twelve hours each, were established in 1881, and same continued to 1891 when three watches of eight hours each were organized. The force engaged in passing boats has been increased with the growth of commerce, the number now aggregating 74; in addition there are 19 others employed as clerks, watchmen, and janitors.

Expenses for operating and care of St. Marys Falls Canal, Michigan.

Year.	Operating.	Repairs.	Total.	Cost per freight ton.
				Mills.
1882	$21,185.86	$10,021.62	$31,207.48	16.62
1883	22,134.97	13,374.73	35,509.70	18.94
1884	20,337.61	10,875.32	31,212.93	12.28
1885	18,635.27	8,607.18	27,242.45	9.49
1886	18,871.84	6,529.11	25,400.95	6.86
1887	18,887.11	3,251.81	22,138.92	4.53
1888	22,858.57	7,040.15	29,898.72	5.36
1889	23,987.45	6,762.00	30,749.45	4.44
1890	22,737.53	11,586.32	34,323.85	4.14
1891	34,657.27	13,673.62	48,330.89	5.80
1892	37,895.93	23,493.81	61,389.74	6.07
1893	34,402.15	8,009.97	42,412.12	3.91
1894	43,103.27	12,109.82	55,213.09	4.95
1895	39,063.20	11,845.47	50,908.67	3.73
1896	34,806.92	25,956.36	60,763.28	4.22
1897	46,750.02	31,354.03	78,104.05	5.60
1898	43,464.99	15,425.73	58,890.72	3.93
1899	65,142.64	25,165.30	90,307.94	4.66
1900	59,282.46	20,010.80	79,293.26	3.28
1901	59,457.05	16,018.28	75,475.33	3.64
1902	66,914.75	20,779.05	87,693.80	2.86
1903	62,648.42	21,228.38	83,876.80	2.65
1904	66,563.96	26,684.51	93,248.47	4.25
1905	64,423.96	20,822.39	85,246.35	2.48
1906	69,259.66	20,740.29	89,999.95	1.99
1907	68,162.42	23,451.77	91,614.19	1.57

O O 4.

IMPROVEMENT OF HAY LAKE AND NEEBISH CHANNELS, ST. MARYS RIVER, MICHIGAN.

The work in progress is under a project adopted by the river and harbor acts of June 13, 1902, and March 3, 1905, providing for a channel of 21 feet navigable depth at low water and 1,500 feet width from St. Marys Falls Canal to the upper entrance to Hay Lake (Little

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Rapids), thence a least width of 600 feet to the foot of Hay Lake, thence deepening to 21 feet the present 300-foot channel to Mud Lake via Middle Neebish, and opening a new 300-foot channel to Mud Lake via West Neebish, thus providing separate channels through this reach for up and down bound boats.

Operations for the fiscal year were as follows:

Under contract for hire of dredge by the working hour three small shoals were removed between the canal and Bayfield shoal. Between October 7 and November 2, 1907, the dredge worked two hundred and sixty and four-tenths hours, and removed 44,790 cubic yards, scow measurement, from an area of 52,772 square yards, at a cost to the United States of $8,463.55.

The widening of the channel through Bayfield shoal by 500 feet to a depth of 21 feet below 580.3 was completed September 28,1907. A dredge working three hundred and ninety-six hours removed 8,790 cubic yards, scow measurement, and a derrick boat working five hundred and forty-nine and five-tenths hours removed 1,525 cubic yards, scow measurement, of sand, gravel, stones, and bowlders, from an area of 47,271 square yards. The contractor worked two hundred and sixty-seven days in excess of the contract time under an authorized extension. The total amount of material removed under this contract was 85,429 cubic yards above the 21-foot grade and 14,274 cubic yards between the 21 and 22 foot grades, at a cost to the United States of $45,357.34. The removal on June 25, 1908, of the buoy marking the former northerly limits of the channel at this point opened the improvement to navigation. This completes the improvement between the canal and head of Little Rapids Cut to a width of 1,500 feet and least depth of 21 feet below extreme low-water plane of 580.4 at the foot of canal and 580.2 at the head of Little Rapids at a total cost under present project of $88,893.65.

On that portion of the channel between Six-mile Point and deep water in Hay Lake a dredge engaged by the working hour was employed eight hundred and sixty-three and eight-tenths hours between July 1 and October 5, 1907, and removed 173,243 cubic yards, scow measurement, of gravel, clay, and silt from an area of 250,370 square yards. The channel from Little Rapids to Hay Lake is now completed to 21 feet depth below a plane the elevation of which is 580.2 at head of Little Rapids and 579.3 in Hay Lake, and has a least width of 600 feet through the Little Rapids, widening below Six-mile Point to 1,700 feet at deep water in Hay Lake. The total cost of this item under present project was $270,340.78.

The channel across the flats foot of Hay Lake, forming the upper entrance to the West Neebish, was completed in 1906, at a cost of $766,261.90. This channel is 32,300 feet long, 300 feet wide, and 21 feet deep below low water of 579.3 feet.

The work at the West Neebish Rapids consists in excavating a channel 13,300 feet long, 300 feet wide, and 22 feet deep below a slope of 579.3 to 578.8, with vertical sides in the rock, and with stone retaining walls 6 feet above the low-water surface to mark both sides of the channel through the greater portion of the rock cut. During the year the four cableways on the work in the dry removed 156,912 cubic yards of rock, full rate, 14,807 cubic yards, half rate, 25,749

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cubic yards earth, full rate, and 1,685 cubic yards, half rate. The channelers cut 3,838 square feet of face. There were 16,397 holes drilled to an average depth of 7 feet and 86,010 pounds of dynamite was used in blasting. The retaining walls were extended for a distance of 800 linear feet, the face measurement of the regular walls being 1,340 square yards. In addition to the regular walls, 772 cubic yards of dry masonry was placed in special wall ends. The retaining walls were completed September 12, 1907. On the earth section four dredges at various times worked three thousand six hundred and twenty-six and six-tenths hours and two derrick boats worked one thousand one hundred and seventy-seven and seven-tenths hours, excavating 164,242 cubic yards, scow measurement, of sand, clay, bowlders, and limestone rock; this amount includes the material removed from dams, payment for which is to be made at rock prices. The rock excavation and construction of walls in the dry was completed October 12, 1907, and the water allowed to fill the area between the cofferdams. Since that time the work has been confined to the removal of material from the earth section, and the removal of the dams, and the entire work is now approaching completion, when the down-bound traffic may be diverted to this route.

The dredging of a new channel across the flats at head of Mud Lake, 19,300 feet long, 21 feet below low water, 578.8, and 300 feet wide, increasing to 900 feet at the angle between courses 7 and 8, was completed December 1, 1907, including the removal of two shoals in Mud Lake under the same contract. Two dredges worked one thousand eight hundred and eleven and three-tenths hours, removing 318,841 cubic yards, scow measurement, of sand, clay, and bowlders from an area of 366,814 square yards. Two derrick boats worked ninety-six and four-tenths hours, and removed 70 cubic yards of bowlders.

The total quantities removed in this reach are 3,324,275 cubic yards soft material, full rate; 227,385 cubic yards, soft material, half rate; 41,386 cubic yards hard material, full rate; 40,184 cubic yards hard material, half rate; 15 cubic yards rock, full rate; and 25 cubic yards rock, half rate. The total cost of this improvement, which completes the channel connecting the West Neebish Rapids with the present channel through Mud Lake, was $503,973.13.

The deepening of the present channel leading from Mud Lake to Sailors Encampment, and lying between the Mud Lake turning buoy and Everens Point, was practically completed June 29. The examination of the channel was not completed on June 30, and a small amount of cleaning up may remain. One dredge worked one thousand four hundred and twenty-eight and one-tenth hours, and excavated 193,843 cubic yards, scow measurement, from an area of 289,046 square yards. The contractor worked one hundred and twelve days in excess of the contract time under an authorized extension.

On August 8 and 9, 1907, a derrick boat, employed by the working hour, removed some spots above grade in the channel abreast of Middle Neebish dike, also on west side of channel at Sailors Encampment, in twenty hours, at a cost of $135.

The work of deepening the present Middle Neebish channel between Mud Lake and Hay Lake was advertised in four sections—

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flats foot of Hay Lake, Middle Neebish Rapids, Little Mu
Sailors Encampment channel. Contracts for the first tw
executed, but the last two sections are being readvertise
bid being considered too high. No work has been done
section. In the Middle Neebish Rapids one dredge
seventy-nine hours, and excavated 8,950 cubic yards, sc
ment, of sand and sandstone rock from an area of 1
yards.

The building of cribs to mark the sides of the West Nee
was continued, and 290 piles were purchased for this
timber substructure of nine cribs is completed; seven of
place and filled ready for concrete superstructure; two o
place, but not filled; and two have not been sunk. T
piers have been built on the rock surface. Piles have
for nine pile structures, and seven of them are complete e
decking. For this work the foundations of cribs have bee
by dredge employed by the working hour, 22,504 cubic
measurement, of material being removed in one hundred a
and four-tenths hours. A derrick boat, engaged by the wo
has been employed eight hundred and nine hours, and
foundations and for filling cribs 5,797 cubic yards of
thousand six hundred and eighty-five cubic yards of sto
cubic yards of concrete have been placed by Governm
The timber framed for cribs during the year amounted
feet, board measure. Two hundred and fifty-nine piles
driven in sixteen days by pile driver engaged by the work

One deck scow, 80 by 22 feet, was built for this wor
sounding raft, 130 by 20 feet, was rebuilt.

For the construction of cribs to mark the channel throu
Middle Neebish 185,081 feet, board measure, of timber was

Surveys were made on all sections on which work was
or contemplated, and the 96,000 soundings taken are bei
and used in computations. There were 198 section stakes
numerous dumping-ground buoys and gauge boards placed
triangulation stations were rebuilt, and channel buoys re

Accidents.—On September 16, 1907, an employee of the c
at West Neebish rock cut fell from one of the cableway t
was killed.

Money statements.

MIDDLE AND WEST NEEBISH CHANNELS, ST. MARYS RIVER, MICHIG

July 1, 1907, balance unexpended	
June 30, 1908, amount expended during fiscal year, for works of improvement	
July 1, 1908, balance unexpended	
July 1, 1908, outstanding liabilities	
July 1, 1908, balance available	
July 1, 1908, amount covered by uncompleted contracts	

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E OF

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MICHIGAN.

al year 1907-8.

ring fiscal year.

itted with my annual report for the
r ending June 30th, 1908.

Chas. D. Townsend

eut. Colonel, Corps of Engineers, U.S.A.

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HAY LAKE AND NEEBISH CHANNELS.

July 1, 1907, balance unexpended	$337,375.19
Amount appropriated by sundry civil act approved May 27, 1908	315,000.00
	652,375.19
June 30, 1908, amount expended during fiscal year, for works of improvement	[a] 31,528.50
July 1, 1908, balance unexpended	620,800.56
July 1, 1908, outstanding liabilities	16,000.00
July 1, 1908, balance available	604,800.56
July 1, 1908, amount covered by uncompleted contracts	670,000.00
Amount (estimated) required for completion of existing project	435,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	435,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

HAY LAKE CHANNEL.

August 2, 1882	$200,000
July 5, 1884	125,000
August 5, 1886	150,000
August 11, 1888	500,000
September 19, 1890	400,000
March 3, 1891	300,000
August 5, 1892	115,000
March 3, 1893	225,000
August 18, 1894	150,000
March 3, 1899	100,000
June 6, 1900	250,000
June 28, 1902	144,115

MIDDLE AND WEST NEEBISH CHANNELS.

June 13, 1902	500,000
March 3, 1903	800,000
March 3, 1905	1,200,000
June 30, 1906	1,000,000
March 4, 1907	1,000,000

HAY LAKE AND NEEBISH CHANNELS.

March 3, 1905	500,000
May 27, 1908	315,000
Total	7,974,115

[a] Actual expenditures during the fiscal year were $31,574.63, which amount includes $1.03 paid by Treasury Department, account of Duluth, South Shore and Atlantic Railway Company, and $46.13 chargeable to Isthmian Canal Commission for inspecting material; deducting this latter amount from the total expenditures leaves $31,528.50 net expenditures.

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CONTRACTS IN FORCE.

CONTRACT DATED APRIL 7, 1904.

Name of contractor: MacArthur Brothers Company, Chicago, Ill.
Amount and character of work: Two million four hundred and nineteen thousand five hundred and sixty dollars; rock and earth excavation at West Neebish Rapids.
Price per unit: Cofferdam, $20,000; earth excavation, 56 cents per cubic yard, bank measurement (full rate), and 28 cents per cubic yard, bank measurement (half rate); rock excavation, $1.36 per cubic yard, bank measurement (full rate), and 68 cents per cubic yard, bank measurement (half rate); retaining walls, at $5.50 per square yard of channel face.
Date of approval: May 7, 1904.
Date of beginning work: July 11, 1904.
Date of expiration: About August 15, 1908 (one thousand good working days).

CONTRACT DATED APRIL 16, 1904.

Name of contractor: Chicago and Great Lakes Dredge and Dock Company, Chicago, Ill.
Amount and character of work: Five hundred and four thousand two hundred and nineteen dollars and fifty-four cents; dredging item H. J., Mud Lake.
Price per unit: Soft material, $0.129 per cubic yard, bank measurement (full rate), and $0.0645 per cubic yard, bank measurement (half rate); hard material, $0.98 per cubic yard, bank measurement (full rate), and $0.49 per cubic yard, bank measurement (half rate); rock, $8.25 per cubic yard, bank measurement (full rate), and $4.125 per cubic yard, bank measurement (half rate).
Date of approval: May 6, 1904.
Date of beginning work: September 1, 1904.
Date of expiration: August 16, 1907.
Date of completion: April 14, 1908.

CONTRACT DATED JULY 8, 1905.

Name of contractor: H. W. Hubbell & Co., Saginaw, Mich.
Amount and character of work: Forty-four thousand six hundred and ninety-five dollars and forty-nine cents; dredging item A_1, Bayfield shoal.
Price per unit: Forty-nine cents per cubic yard, bank measurement.
Date of approval: July 19, 1905.
Date of beginning work: August 12, 1905.
Date of expiration: Indefinite, as extended.
Date of completion: September 28, 1907.

CONTRACT DATED NOVEMBER 8, 1906.

Name of contractor: The Lake Erie Dredging Company, Buffalo, N. Y.
Amount and character of work: Sixty-seven thousand two hundred and seventy-three dollars and eighty-eight cents; time work by dredging plant.
Price per unit: Thirty-two dollars and fifty cents per working hour.
Date of approval: November 19, 1906.
Date of beginning work: November 5, 1906.
Date of expiration and completion: November 13, 1907.

WRITTEN PROPOSAL AND WRITTEN ACCEPTANCE DATED JANUARY 31, FEBRUARY 19 AND 21, 1907.

Name of contractor: MacArthur Brothers Company, Chicago, Ill.
Amount and character of work: Four thousand seven hundred and seventy-six dollars and thirty-three cents; excavating site and constructing dry masonry wall ends.
Price per unit: Excavating, $1.36 per cubic yard; constructing dry masonry, $4.15 per cubic yard.
Date of beginning work: About May 1, 1907.
Date of expiration: About June 15, 1908.
Date of completion: September 12, 1907.

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EMERGENCY CONTRACT DATED APRIL 1, 1907.

Name of contractor: Peninsula Bark and Lumber Company, Sault Ste. Marie, Mich.
Amount and character of work: Twelve thousand seven hundred and thirty-eight dollars; furnishing and delivering hemlock timber.
Price per unit: Twenty-two dollars per thousand feet B. M.
Date of beginning work: April 11, 1907.
Date of expiration: June 15, 1907; time extended sixty days.
Date of completion: July 23, 1907.

EMERGENCY CONTRACT DATED AUGUST 14, 1907.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: Two thousand one hundred and ninety-two dollars and forty-eight cents under this appropriation; time work by steam derrick boat, with diving plant, etc.
Price per unit: Six dollars and seventy-five cents per working hour; dynamite, 17 cents per pound.
Date of beginning work: August 9, 1907.
Date of expiration and completion: November 20, 1907.

EMERGENCY CONTRACT DATED SEPTEMBER 17, 1907.

Name of contractor: Elk Cement and Lime Company, Petoskey, Mich.
Amount and character of work: Nine hundred and eighty-one dollars and fifty cents under these appropriations; furnishing and delivering Portland cement.
Price per unit: One dollar and fifty-one cents per barrel.
Date of expiration: December 8, 1907.
Date of completion: November 19, 1907.

EMERGENCY CONTRACT DATED NOVEMBER 26, 1907.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: About $2,000 under these appropriations; time work by steam derrick boat, with diving plant, etc.
Price per unit: Six dollars and seventy-five cents per working hour; dynamite, 16 cents per pound.
Date of beginning work: November 26, 1907.
Date of expiration: Indefinite.

EMERGENCY CONTRACT DATED JANUARY 14, 1908.

Name of contractor: Peninsula Bark and Lumber Company, Sault Ste. Marie, Mich.
Amount and character of work: One thousand six hundred and ninety-eight dollars and thirty cents; furnishing and delivering piles.
Price per unit: Ten cents, 12 cents, and 15 cents per linear foot.
Date of expiration and completion: May 23, 1908.

EMERGENCY CONTRACT DATED MAY 13, 1908.

Name of contractor: T. L. Durocher, Sault Ste. Marie, Mich.
Amount and character of work: Amount indefinite; time work by steam derrick boat, with clam shell, etc.
Price per unit: Six dollars and seventy-five cents per working hour; dynamite, 16 cents per pound.
Date of beginning work: May 11, 1908.
Date of expiration: Indefinite.

CONTRACT DATED SEPTEMBER 5, 1906.

Name of contractor: Great Lakes Construction Company, Buffalo, N. Y.
Amount and character of work: About $24,000; dredging shoal 28, in Mud Lake.
Price per unit: Twenty-two and one-half cents per cubic yard, bank measurement (full rate), and 11¼ cents per cubic yard, bank measurement (half rate).
Date of approval: September 18, 1906.
Date of beginning work: May 21, 1907.
Date of expiration: September 10, 1907. (Contract extended.)

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CONTRACT DATED APRIL 13, 1908.

Name of contractor: N. G. DeHaas, Marquette, Mich.
Amount and character of work: Three thousand and ninety dollars and eighty-five cents; furnishing and delivering timber.
Price per unit: Sixteen dollars and seventy cents per 1,000 feet B. M.
Date of beginning work: May 21, 1908.
Date of expiration: June 12, 1908.
Date of completion: June 9, 1908.

EMERGENCY CONTRACT DATED JUNE 26, 1908.

Name of contractor: Fiborn Limestone Company, Marquette, Mich.
Amount and character of work: About $800 under this appropriation; furnishing and delivering crushed stone.
Price per unit: One dollar and three cents, and 85 cents per gross ton.
Date of beginning work: July 6, 1908.
Date of expiration: September 1, 1908.

CONTRACT DATED MAY 16, 1908.

Name of contractor: Chas. Simono, Two Rivers, Wis.
Amount and character of work: About $80,000; dredging Item M, upper entrance Middle Neebish.
Price per unit: Seventeen and seven-tenths cents per cubic yard (full rate), 8.85 cents per cubic yard (half rate).
Date of approval: June 2, 1908.
Date of commencement: Indefinite.
Date of expiration: Two hundred and twenty-five working days from commencement.

CONTRACT DATED MAY 21, 1908.

Name of contractor: Great Lakes Dredge and Dock Co., Chicago, Ill.
Amount and character of work: About $580,000; dredging Item N_1, Middle Neebish.
Price per unit: Two dollars and sixty cents per cubic yard (full rate), $1.30 per cubic yard (half rate).
Date of approval: June 8, 1908.
Date of commencement: Indefinite.
Date of expiration: Three hundred working days from date of commencement.

O O 5.

IMPROVEMENT OF CHEBOYGAN HARBOR, MICHIGAN.

During the fiscal year work on the improvement of this harbor was confined to the extension of the project authorized by the act of March 2, 1907, which provides for a channel 60 feet wide and 8 feet deep from the State Road Bridge to the lock and dam in Cheboygan River.

Contract entered into with Great Lakes Dredge and Dock Company, of Chicago, Ill. (dated September 14, 1907, and approved September 23, 1907), for doing required work of dredging at 42 cents per cubic yard, scow measurement. Work under the contract was begun on October 1, 1907, and continued until December 4, 1907, when work for the season was suspended; 22,091 cubic yards of material were removed during this period and deposited in accordance with the specifications, providing a completed channel from the State Road Bridge two-thirds the distance to the lock. The progress of the work was very slow on account of the hard material encoun-

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tered and the necessity of casting over through one cut and redredging, in order to handle the dump scows.

Operations under this contract were resumed April 28, 1908, and 406 cubic yards of material were removed on the 28th and 29th, when the contractors were compelled to stop work on account of the excessively swift current running in the river. The water continued to rise and, after waiting until May 16, the contractors were authorized to withdraw their plant from the work until such time as the condition of the river would permit them to resume work. Twenty-two thousand four hundred and seven cubic yards of material have been removed under the contract.

Upon the completion of the present contract there will remain an unimproved stretch included in the 18-foot channel project extending down 900 feet from the State Road bridge. The estimated cost of this work is $14,000, all of which will have to be provided by appropriation, as the estimated balance of $9,000 remaining after the completion of the present contract work will be applied for maintenance only.

Money statement.

July 1, 1907, balance unexpended	$22,450.32
June 30, 1908, amount expended during fiscal year for works of improvement	[a] 8,971.89
July 1, 1908, balance unexpended	13,478.43
July 1, 1908, outstanding liabilities	927.82
July 1, 1908, balance available	12,550.61
July 1, 1908, amount covered by uncompleted contracts	4,464.18
Amount (estimated) required for completion of existing project	5,000.00

APPROPRIATIONS.

March 3, 1871	$10,000	July 5, 1884	$5,000
June 10, 1872	15,000	August 5, 1886	15,000
March 3, 1873	15,000	August 11, 1888	15,000
June 23, 1874	15,000	June 3, 1896	12,000
March 3, 1875	15,000	March 3, 1899	8,000
August 14, 1876	10,000	June 13, 1902	8,000
June 18, 1878	8,000	March 3, 1905	7,500
March 3, 1879	3,000	March 2, 1907	15,000
June 14, 1880	6,000		
March 3, 1881	6,000	Total	198,500
August 2, 1882	10,000		

CONTRACT IN FORCE.

Name of contractors: Great Lakes Dredge and Dock Company, Chicago, Ill.
Character of work: Dredging.
Price: Forty-two cents per cubic yard, scow measurement.
Dated: September 14, 1907.
Date of beginning work: October 1, 1907.
To be completed in seventy good working days after beginning work.
Extension of time of completion for a reasonable length of time authorized May 9, 1908.

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COMMERCIAL STATISTICS.

Receipts and shipments by vessel for the calendar year ended December 31, 1907.

[Compiled from statements furnished by Mr. C. L. Marquette, deputy collector of customs, Cheboygan, Mich.]

Articles.	Received.	Shipped.	Articles.	Received.	Shipped.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Booms	500		Lumber	1,128	54,837
Brick	5,000		Merchandise, general	2,739	2,181
Cedar posts		2,474	Paper		5,498
Coal	2,000		Potatoes	4	
Fish		1,400	Slabs		4,800
Gasoline		6	Stone	2,500	
Hay and feed	180	27	Telegraph poles		4,000
Iron and ore	3		Ties		73,440
Lath		285	Wood		358
Lime and cement		13			
Live stock	3		Total	444,557	149,211
Logs	430,500				

* Including $2.42 expended by Treasury Department.

O O 6.

IMPROVEMENT OF ALPENA HARBOR (THUNDER BAY RIVER), MICHIGAN.

In accordance with advertisement published June 3, 1907, inviting bids for the hire of a dredging plant to be used in removing shoals so as to restore the navigable depth of 16 feet in the bay and harbor in accordance with the project, proposals were opened July 3, 1907, and the dredging plant belonging to M. Sullivan, of Buffalo, N. Y., was leased on July 25, 1907, at $25 per working hour. The work was begun August 30, 1907, and completed September 28, 1907. The total time the plant was employed was one hundred and ninety-four hours and five minutes, and 14,961 cubic yards of material were removed.

When work was finished the channel had a width of 140 feet opposite the light-house, tapering to 100 feet at Second Street Bridge, and from Second Street Bridge for a distance of 2,100 feet above, a width of 60 feet, with a clear depth of 16 feet throughout.

Original estimate of cost, 1876, 1881, and 1889 (aggregate)	$55,851.48
Whole amount expended to June 30, 1908	55,090.00

Money statement.

July 1, 1907, balance unexpended	$5,437.49
June 30, 1908, amount expended during fiscal year for maintenance of improvement	5,027.49
July 1, 1908, balance unexpended	410.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	4,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Thunder Bay Harbor, Michigan:	
August 14, 1876	$4,500
August 2, 1882	15,000
September 19, 1890	5,500
Thunder Bay River, Michigan:	
September 19, 1890	10,000
July 13, 1892	10,000
Alpena Harbor, Michigan:	
August 18, 1894	$4,000
June 3, 1896	2,500
March 2, 1907	4,000
Total	55,500

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CONTRACT IN FORCE.

Name of contractor: M. Sullivan, Buffalo, N. Y.
Character of work: Dredging.
Price: $25 per hour for lease of plant.
Dated: July 25, 1907.
Date of beginning work: August 30, 1907.
Date of completion: September 28, 1907.

COMMERCIAL STATISTICS.

Receipts and shipments by vessel for the calendar year ended December 31, 1907.

[Compiled from statements furnished by Mr. James S. Moffat, deputy collector of customs, Alpena, Mich.]

Articles.	Received.	Shipped.	Articles.	Received.	Shipped.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Brick	375	.....	Leather	2	5
Cedar posts	.....	16,946	Live stock	35	.....
Cedar ties	.....	42,125	Lumber	.....	75,306
Cement	.....	23,966	Machinery	2,500	300
Coal	385,011	.....	Merchandise, general	16,100	4,000
Farm products	285	36	Paper	5	225
Fish	743	235	Pulp wood	1,000	.....
Flour	1,100	.....	Salt	1,260	.....
Fruit, miscellaneous	300	45	Shingles	.....	857
Grain	687	.....			
Hay and feed	10,000	.....	Total	419,403	166,116
Lath	.....	1,050			

O O 7.

IMPROVEMENT OF SAGINAW RIVER, MICHIGAN.

A complete survey of the river and of the dredged channel a farther distance of 4½ miles out into Saginaw Bay, was made during the months of July and August, 1907. After the work of reducing and plotting the field notes had been completed, it was decided to apply the available balance to the restoration of the dredged channel through such shoals as had formed and to the completion, as far as the funds permitted, of the present approved project, with a view to securing a channel with a width of 200 feet, which would be 14 feet deep from the deeper waters in Saginaw Bay to Portsmouth Bridge in Bay City, and 12 feet deep thence to the head of the river.

Specifications with this object in view were accordingly prepared, dividing the river for economical reasons into two sections; the first, known as section A, extending from the light-house at the mouth of the river to the Inter-Urban Bridge, and the second, known as section B, from the Inter-Urban Bridge to the junction of the Shiawassee and Tittabawassee rivers.

Advertisement was published December 16, 1907, inviting proposals and the bids were opened January 16, 1908. The contract for Section A was awarded to the Central Dredging Company, of Cleveland, Ohio, at 16½ cents per cubic yard, scow measurement, and the contract for Section B to the Toledo Dredge and Dock Company, of Toledo, Ohio, at 28 cents per cubic yard, bank measurement.

Work under the contract with the Toledo Dredge and Dock Company, for dredging Section B, was begun May 27, 1908, and at the

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close of the fiscal year was still in progress, a total of 24,100 cubic yards, consisting mostly of sand and silt, having been removed. A suction dredge was used on this work.

The Central Dredging Company began work on their contract with dipper dredge *No. 1* on June 3, 1908, a short distance below the Bay City Boat Clubhouse, working downstream. At the close of the year 16,449 cubic yards had been removed.

The present approved project for this river, calling for a channel 200 feet wide and 14 feet deep from deep water in Saginaw Bay to Bay City, and thence 12 feet deep to the upper limits of Saginaw city, has not been completed, the work done thus far having secured only a narrow through channel of the required depth. This channel has little permanence, bars usually forming after each spring freshet.

Money statement.

July 1, 1907, balance unexpended	$106,124.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	4,408.96
July 1, 1908, balance unexpended	101,715.04
July 1, 1908, outstanding liabilities	10,066.44
July 1, 1908, balance available	91,648.60
July 1, 1908, amount covered by uncompleted contracts	82,721.41
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	50,000.00

APPROPRIATIONS.

June 23, 1866	$67,500.00	September 19, 1890	$75,000.00
March 2, 1867	28,000.00	July 13, 1892	100,000.00
July 25, 1868 (allotment)	9,000.00	August 18, 1894	40,000.00
July 11, 1870	1,500.00	June 3, 1896	40,000.00
June 23, 1874	15,000.00	March 3, 1899	40,000.00
March 3, 1875	30,000.00	June 13, 1902	50,000.00
August 14, 1876	11,000.00	Repayments	1.84
June 18, 1878	25,000.00	March 3, 1905	30,000.00
March 3, 1879	8,000.00	March 2, 1907	75,000.00
June 14, 1880	15,000.00		
March 3, 1881	10,000.00		943,751.84
August 2, 1882	125,000.00	Carried to surplus fund	1,000.00
July 5, 1884	50,000.00		
August 5, 1886	33,750.00	Balance	942,751.84
August 11, 1888	65,000.00		

Estimated cost of successive projects, 1867 to 1882	$289,795.00
Estimated cost of project for 1882	446,000.00
Total	735,795.00
Carried to surplus fund	1,000.00
Whole amount expended to June 30, 1908	841,096.80

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CONTRACTS IN FORCE.

Name of contractors: Central Dredging Company, Cleveland, Ohio.
Character and amount of work: Dredging 159,900 cubic yards.
Price: 16½ cents per cubic yard, scow measurement.
Dated: February 10, 1908.
Date of approval: March 7, 1908.
Date of beginning work: June 3, 1908.
To be completed in 170 good working days from May 15, 1908.

Name of contractors: Toledo Dredge and Dock Company, Toledo, Ohio.
Character and amount of work: Dredging 314,000 cubic yards.
Price: 28 cents per cubic yard, bank measurement.
Dated: February 4, 1908.
Date of approval: March 7, 1908.
Date of beginning work: May 27, 1908.
To be completed in 170 good working days from May 15, 1908.

COMMERCIAL STATISTICS.

Receipts and shipments by vessel for the calendar year ended December 31, 1907.

[Compiled from statements furnished by Mr. Dewitt C. Brawn, deputy collector, Bay City, Mich., and Mr. W. G. Emerick, deputy collector, Saginaw, Mich.]

Article.	Received.	Shipped.	Article.	Received.	Shipped.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Cement		14,329	Machinery		10
Coal	12,271	2,122	Merchandise, general	2,490	2,230
Farm products	301		Pickets	3,783	
Fish	75		Salt	16,918	
Flour	149		Shingles	163	
Hay		125	Stone	7,895	
Iron	9,500		Timber		407
Lath	1,974				
Logs	7,000		Total	254,897	20,675
Lumber	192,378	1,452			

O O 8.

IMPROVEMENT OF SEBEWAING RIVER, MICHIGAN.

During the month of April, 1908, an examination of the river was made and the channel was found to be blocked by a bar at the mouth of the river over which there was not more than 2.5 feet of water. On account of the small amount of money available, it was decided to remove about 9,000 cubic yards of material, which would restore a channel depth of 7 feet. Bids were invited by poster and circular letter, dated April 23, 1908, but none were received. Arrangements were then made with Thomas B. Cresswell, of Saginaw, Mich., covering the lease of his dredging plant for such time as would be necessary to do the required work, at $10 per working hour. Work was begun on June 17, 1908, and was still in progress at the close of the year. The dredge worked thirty-seven hours and forty-five minutes, and a one-dredge cut about 24 feet wide was completed through the bar.

The expenditures necessary for improvement are deemed to be out of all proportion to the amount of commerce involved, and for this reason this river is not regarded as worthy of continued improvement. Any expenditure made hereafter should be for maintenance only, and for the present such expenditure should not exceed $2,000 a year. It is not believed that much good can be accomplished by a channel 8 feet deep, and there is not enough commerce to warrant the expenditure needed in creating a channel of greater depth.

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Money statement.

July 1, 1907, balance unexpended	$2,744.14
June 30, 1908, amount expended during fiscal year for maintenance of improvement	34.15
July 1, 1908, balance unexpended	2,709.99
July 1, 1908, outstanding liabilities	440.00
July 1, 1908, balance available	2,269.99
July 1, 1908, amount covered by uncompleted contracts	2,122.50
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	2,000.00

APPROPRIATIONS.

March 3, 1875	$8,000	March 3, 1905	$5,000
June 14, 1880	7,000	March 2, 1907	2,000
June 3, 1896	5,000		
March 3, 1899	32,000	Total	59,000

COMMERCIAL STATISTICS.

Receipts and shipments by vessels for the calendar year ended December 31, 1907.

[Compiled from information obtained from merchants at Sebewaing, Mich.]

Article.	Received.	Shipped.	Article.	Received.	Shipped.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Cement	20		Lath	60	
Coal	300		Lumber	2,625	
Farm products		27	Mill stuff		180
Fish	317		Salt	150	
Fruit, miscellaneous		45	Shingles	30	
Grain		240			
Gravel	325		Total	3,827	412

O O 9.

IMPROVEMENT OF HARBOR OF REFUGE AT HARBOR BEACH, LAKE HURON, MICHIGAN.

At the beginning of the present fiscal year, operations were in progress under the contract with Messrs. Hugo & Tims, of Duluth, Minn., for rebuilding in concrete the superstructure of part of the main pier, dated April 23, 1906, and approved May 29, 1906. Work under this contract was begun May 24, 1906, and was finished September 24, 1907. As a result of the work under this contract 1,836 linear feet of concrete superstructure were completed in 228 working days, making a total of 3,542 feet since the work on the main pier was begun.

Actual work under the third contract with Hugo & Tims, dated June 10, 1907, and approved June 26, 1907, for completing the work of rebuilding in concrete the superstructure of the main pier, was begun on July 17, 1907, at station 3542, the point where work under the second contract was stopped, and will be carried on until the pier is completed. Owing to adverse weather conditions, progress

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during the remainder of the season until the work of building the monolithic sections was discontinued in October, was relatively slow, but during that period 12 monoliths were built and 305 feet of completed structure provided.

Work under this contract was resumed on April 13, 1908, with the tearing up of the wooden superstructure of the pier. Timbering was begun on April 29, and the leveling off and setting of footing blocks on May 20. The first monolithic block was built on June 9. Progress has been slow on account of unfavorable weather conditions. At the close of the year, the completed work had reached station 3847.

During the month of August, 1907, all the holes in the walls of the south pier made by the storms of the previous fall and winter were repaired by day labor and about 250 feet of new decking was placed. The remaining portion of the decking was gone over and patched up, placing the pier in fair condition.

The timber in the north pier is in a very advanced stage of decay. In places the walls are rotted through and the stone filling exposed.

The total amount expended during the fiscal year was $141,645.14, of which $873.04 was applied to making necessary repairs to the south pier, $7,020.23 to supervision of vessels using the harbor and control of the harbor, and $133,751.87 to building concrete superstructure and expenses in connection therewith.

Money statement.

July 1, 1907, balance unexpended	$263,262.02
June 30, 1908, amount expended during fiscal year for maintenance of improvement	141,645.14
July 1, 1908, balance unexpended	121,616.88
July 1, 1908, outstanding liabilities	25,890.13
July 1, 1908, balance available	95,726.75
July 1, 1908, amount covered by uncompleted contracts	79,389.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	275,000.00

APPROPRIATIONS.

March 3, 1871	$100,000.00	June 3, 1896	$16,000.00
June 10, 1872	100,000.00	March 3, 1899	50,000.00
March 3, 1873	75,000.00	June 6, 1900	150,000.00
June 23, 1874	75,000.00	June 13, 1902	7,500.00
March 3, 1875	100,000.00	April 28, 1904	50,000.00
August 14, 1876	75,000.00	March 3, 1905	200,000.00
June 18, 1878	100,000 00	March 2, 1907	150,000 00
March 3, 1879	75,000.00		
June 14, 1880	75,000.00	Total	1,943,500.00
March 3, 1881	50,000.00	Carried to surplus fund	30,000.00
August 2, 1882	75,000.00		
July 5, 1884	75,000.00		1,913,500.00
August 5, 1886	75,000.00	Received from other sources	2,867.21
August 11, 1888	70,000.00		
September 19, 1890	30,000.00	Total	1,916,367.21
July 13, 1892	150,000.00		
August 18, 1894	20,000.00		

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CONTRACTS IN FORCE.

Contract in force with Hugo & Tims for rebuilding in concrete the second section of the superstructure of the main pier, approved May 29, 1906; actual date of beginning work, May 24, 1906; completed September 24, 1907; contract cost per linear foot, $108.62; also contract in force with Hugo & Tims for rebuilding the superstructure of the remaining portion of the main pier, approved June 26, 1907, to be completed in approximately 210 working days; contract cost per linear foot, $119.98; date of beginning work, July 17, 1907.

COMMERCIAL STATISTICS.

TABLE No. 1.—*Summary of vessels sheltered in the harbor of refuge at Harbor Beach, Mich., from July 1, 1907, to June 30, 1908, and the direction of wind at time of entering the harbor.*

Direction of wind at time of entering.	1907.						1908.			Total.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Apr.	May.	June.	
North:										
Steam	4	8	3	5	3	0	0	13	10	46
Sail	0	2	0	0	0	0	0	1	0	3
Tows	0	5	1	0	0	0	0	3	1	10
Total	4	15	4	5	3	0	0	17	11	59
Northwest:										
Steam	10	17	27	56	31	6	4	4	4	159
Sail	0	0	0	3	1	0	0	0	1	5
Tows	0	3	11	28	11	1	0	0	1	55
Total	10	20	38	87	43	7	4	4	6	219
West:										
Steam	14	19	10	12	8	1	4	1	0	69
Sail	0	1	0	0	1	0	0	0	0	2
Tows	0	2	2	9	2	0	1	0	0	16
Total	14	22	12	21	11	1	5	1	0	87
Southwest:										
Steam	25	21	54	25	43	1	8	6	34	217
Sail	0	1	3	0	1	0	0	1	4	10
Tows	0	1	10	4	11	0	0	1	0	27
Total	25	23	67	29	55	1	8	8	38	254
South:										
Steam	6	6	8	4	0	1	1	0	1	27
Sail	0	1	0	1	0	0	0	0	0	2
Tows	0	0	1	1	0	0	0	0	0	2
Total	6	7	9	6	0	1	1	0	1	31
Southeast:										
Steam	17	12	7	13	7	0	6	21	12	95
Sail	2	1	1	1	0	0	0	1	0	6
Tows	2	1	2	3	3	0	0	0	0	11
Total	21	14	10	17	10	0	6	22	12	112
East:										
Steam	0	2	4	0	0	0	0	2	2	10
Sail	0	0	0	0	0	0	0	0	0	0
Tows	0	0	1	0	0	0	0	0	0	1
Total	0	2	5	0	0	0	0	2	2	11
Northeast:										
Steam	1	13	17	11	5	0	0	26	11	84
Sail	0	0	2	0	1	0	1	1	0	5
Tows	0	0	6	2	2	0	0	9	1	20
Total	1	13	25	13	8	0	1	36	12	109
Total each month:										
Steam	77	98	130	126	97	9	23	73	74	707
Sail	2	6	6	5	4	0	1	4	5	33
Tows	2	12	34	47	29	1	1	13	3	142
Total	81	116	170	178	130	10	25	90	82	882

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TABLE No. 2.—*Classified table of tonnage, by months, sheltered in the harbor of refuge at Harbor Beach, Mich., from July 1, 1907, to June 30, 1908.*

Date.	Steam.		Sail.		Tow.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
1907.								
July	77	74,621	2	177	2	576	81	75.374
August	98	84,600	6	547	12	5,989	116	91,136
September	130	115,408	6	624	34	19,643	170	135,675
October	126	102,674	5	444	47	29,929	178	133,047
November	97	83,503	4	403	29	24,477	130	108,443
December	9	10,267	.....	.....	1	2,236	10	12,503
1908.								
April	23	15,988	1	406	1	354	25	16,748
May	73	64,043	4	495	13	7,697	90	72,235
June	74	72,794	5	442	3	1,619	82	74,855
Total	707	623,898	33	3,598	142	92,520	882	720,016

TABLE No. 3.—*Number and tonnage of vessels entering the harbor of refuge at Harbor Beach, Mich., 1877 to 1907, inclusive.*

Calendar year.	Steam.	Tow.	Sail.	Total.	Total vessels.	Average tonnage.
	Tons.	*Tons.*	*Tons.*	*Tons.*		
1877	63,966	50,954	27,699	142,619	493	289
1878	104,025	99,282	39,699	243,006	781	311
1879	133,080	100,096	45,750	278,926	921	303
1880	158,702	147,260	55,630	361,592	1,317	275
1881	144,645	127,855	55,960	328,460	1,176	279
1882	146,132	114,067	26,504	286,703	1,022	280
1883	177,122	114,091	32,713	323,926	1,139	284
1884	156,518	122,980	34,724	314,222	1,142	275
1885	196,364	151,607	29,426	377,397	1,158	325
1886	196,335	140,862	33,790	370,987	1,304	284
1887	271,327	153,087	33,680	458,094	1,447	317
1888	271,917	202,191	39,756	513,864	1,624	316
1889	289,719	165,896	37,922	493,537	1,512	326
1890	325,852	169,104	38,826	533,782	1,575	339
1891	292,917	171,067	27,076	491,060	1,341	366
1892	362,486	162,605	29,465	554,556	1,441	385
1893	243,451	113,915	20,897	378,263	982	385
1894	321,511	134,034	22,961	478,506	1,150	416
1895	356,532	167,237	26,898	550,667	1,204	457
1896	246,477	105,988	24,621	377,086	1,073	351
1897	304,460	153,776	21,151	479,387	1,205	398
1898	505,630	107,176	18,090	630,896	1,204	523
1899	590,547	81,143	20,834	692,544	1,254	544
1900	617,161	124,924	20,919	763,004	1,266	603
1901	744,154	151,023	16,841	912,018	1,338	682
1902	747,179	124,139	21,871	893,189	1,349	662
1903	662,724	105,650	12,167	780,541	1,081	723
1904	601,872	67,474	9,582	678,928	922	736
1905	695,246	94,152	10,843	800,241	1,099	728
1906	684,995	79,821	7,059	771,875	954	809
1907	605,647	92,049	3,922	701,618	887	791
Total	11,218,693	3,895,505	847,296	15,961,494	36,761	.....

O O 10.

IMPROVEMENT OF MOUTH OF BLACK RIVER, ROUGE RIVER, AND MONROE HARBOR, MICHIGAN.

(A) MOUTH OF BLACK RIVER.

The operations under contract with the Muir-O'Sullivan Dredge and Dock Company, of Port Huron, Mich., dated April 12 and approved April 24, 1907, which were in progress at the close of the

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last fiscal year, were continued until August 10, 1907, when the work was completed. The contract price was 15½ cents per cubic yard, scow measurement. Progress on the work was slow and an extension of time for completion for a reasonable period was authorized by the Chief of Engineers June 27, 1907. The sinking of the dredge during the night of June 27, and the time subsequently consumed in raising the dredge and making necessary repairs, delayed the work still further, and it was not completed until August 10, 1907. A total of 23,506 cubic yards were removed under the contract, and the projected depth of 16 feet was restored over the area which had shoaled in the St. Clair River at the mouth of the Black River and within the Black River up to the first bridge crossing same.

Original estimated cost (1871) of removing middle ground to depth of—	
15 feet	$67,320.00
18 feet	157,520.00
Whole amount expended to June 30, 1908	97,856.89

Money statement.

July 1, 1907, balance unexpended	$6,426.85
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	3,783.74
July 1, 1908, balance unexpended	2,643.11
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	5,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Mouth of Black River, in St. Clair River, Michigan:	
June 10, 1872	$15,000
St. Clair River, at mouth of Black River, Michigan:	
March 3, 1873	15,000
June 23, 1874	15,000
March 3, 1875	10,000
June 18, 1878	1,500
Mouth of Black River, Michigan:	
August 11, 1888	10,000
Mouth of Black River, Michigan—Continued.	
September 19, 1890	$10,000
July 13, 1892	10,000
August 18, 1894	4,000
June 3, 1896	4,000
March 3, 1899	4,000
June 13, 1902 (allotment)	1,000
March 2, 1907 (allotment)	1,000
Total	100,500

CONTRACT IN FORCE.

Name of contractor: Muir-O'Sullivan Dredge and Dock Company, Port Huron, Mich.
Character of work: Dredging.
Price: 15½ cents per cubic yard, scow measurement.
Date of approval: April 24, 1907.
Date of beginning work: May 8, 1907.
To be completed within 40 working days.
Time for completion extended for a reasonable period beginning June 25, 1907.
Completed: August 10, 1907.

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(B) ROUGE RIVER.

The work of securing the 21-foot depth from the mouth of the river to the first bridge crossing same, a distance of about 1,400 feet, authorized by the river and harbor act of March 2, 1907, was begun July 1, 1907, under a contract with the Toledo Improvement Company, of Toledo, Ohio, dated July 6, 1907, to do the proposed work at 16 cents per cubic yard, scow measurement. This work was carried forward until a point nearly over the tunnel of the Solvay Process Company crossing the river, was reached. At this point, the piling under the Solvay Company's dock was carried away on account of the underlying material (owing to its soft consistency) running into the newly dredged channel, thus endangering the standpipes of the Solvay Company and threatening to cut off their water supply. As it was considered that a channel sufficient for the wants of navigation had been provided, the work was stopped at this point on August 2, 1907. Twenty-two thousand and forty-three cubic yards of material were removed under this contract, and a 21-foot channel was provided from the 21-foot curve in the Detroit River to a point nearly over the Solvay Process Company's tunnel, the channel extending to within 25 feet of the dock line on each side of the river.

In August, 1907, the dredging plant of Messrs. G. H. Breymann & Bro., of Toledo, Ohio, was leased at a rental of $16 per hour, for the purpose of removing to a depth of 16 feet the shoals which had formed in the dredged channel above the Solvay Process Company's bridge. The work was begun on August 2, 1907, and continued until September 9, 1907. The plant was employed on this work a total of three hundred and twelve hours and thirty minutes, and removed 24,003 cubic yards of material. At the conclusion of work, the channel had a width of from 75 to 100 feet and a least depth of 16 feet from the Solvay Company's bridge to a point about 250 feet above River Road Bridge.

Original estimated cost of the work, 1887	$31,690.39
Whole amount expended to June 30, 1908	66,160.96

Money statement.

July 1, 1907, balance unexpended		$9,362.79
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$3,644.08	
For maintenance of improvement	5,189.67	
		8,833.75
July 1, 1908, balance unexpended		529.04
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908		10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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APPROPRIATIONS.

August 11, 1888	$10,000
September 19, 1890	10,000
July 13, 1892	11,690
August 18, 1894	5,000
June 3, 1896	5,000
March 3, 1899 (transferred from appropriation for constructing turning basin in Rouge River, Michigan)	5,000
June 13, 1902 (allotment)	5,000
March 3, 1905 (allotment)	8,000
March 2, 1907 (allotment)	7,000
Total	66,690

CONTRACTS IN FORCE.

Name of contractor: Toledo Improvement Company, Toledo, Ohio.
Character and amount of work: Dredging 23,000 cubic yards.
Price: 16 cents per cubic yard, scow measurement.
Dated: July 6, 1907.
Emergency contract.
Date of beginning work: July 1, 1907.
Date of completion: August 2, 1907.

Name of contractor: G. H. Breymann & Bro., Toledo, Ohio.
Character of work: Dredging done with leased plant.
Price: $16 per working hour.
Dated: August 15, 1907.
Date of beginning work: August 2, 1907.
Date of completion: September 9, 1907.

COMMERCIAL STATISTICS.

Receipts and shipments by vessel for the calendar year ended December 31, 1907.

[Compiled from statements furnished by those doing business along the river front.]

Article.	Received.	Shipped.	Article.	Received.	Shipped.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Coal	3,735		Salt	2,420	
Iron ore	156,347		Soda ash		5,000
Lath	520				
Lumber	45,522		Total	248,544	5,000
Pulp wood	40,000				

(C) HARBOR OF MONROE.

The project for the improvement of this harbor was practically completed in 1845.

An examination of the harbor made during the month of April, 1908, showed that the channel depths had not changed materially, but that considerable repairs were required to the crib work of the north pier and to the decking of both piers. Proposals covering the proposed work were invited by poster and circular letter dated May 9, 1908, and were opened May 25, 1908. The work was awarded to the John Ginzel Company, of Detroit, Mich., the lowest bidders. Work was begun June 1, 1908. At the close of the year, all the piles

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required had been driven and all the work torn out, the work being about half completed.

Money statement.

July 1, 1907, balance unexpended	$6,209.92
June 30, 1908, amount expended during fiscal year for maintenance of improvement	33.84
July 1, 1908, balance unexpended	6,176.08
July 1, 1908, outstanding liabilities	400.00
July 1, 1908, balance available	5,776.08
July 1, 1908, amount covered by uncompleted contracts	1,479.14

APPROPRIATIONS.

February 24, 1835	$30,000.00	March 3, 1881	$1,000.00
July 2, 1836	15,000.00	August 2, 1882	1,000.00
March 3, 1837	30,000.00	August 5, 1886	2,000.00
July 7, 1838	15,000.00	August 11, 1888	5,000.00
June 11, 1844	20,000.00	September 19, 1890	5,000.00
August 30, 1852	14,000.00	July 13, 1892	10,000.00
June 23, 1866	31,015.27	August 18, 1894	5,000.00
June 10, 1872	10,000.00	June 3, 1896	5,000.00
March 3, 1873	15,000.00	March 3, 1899	5,000.00
June 23, 1874	10,000.00	June 13, 1902 (allotment)	1,500.00
March 3, 1875	10,000.00	March 3, 1905 (allotment)	5,000.00
August 14, 1876	5,000.00	March 2, 1907 (allotment)	4,000.00
June 8, 1878	2,500.00		
March 3, 1879	2,000.00	Total	261,015.27
June 14, 1880	2,000.00		

CONTRACT IN FORCE.

Name of contractor: John Ginzel Company, Detroit, Mich.
Character and amount of work: Repairs to piers, driving piles, etc., at a cost of $1,780.
Prices: Removing old superstructure, 90 cents per linear foot; plank and stringers in place, $58 per thousand feet; piles, $8.75 each, driven; iron, 5 cents per pound.
Dated: June 3, 1908.
Emergency contract.
Date of beginning work: June 1, 1908.
To be completed by July 15, 1908.

COMMERCIAL STATISTICS.

Receipts and shipments, by vessel, for the calendar year ended December 31, 1907.

[Compiled from statements furnished by Mr. A. S. Dewey, Monroe, Mich.]

Articles.	Received.	Shipped.
	Tons.	*Tons.*
Fish	200	400
Sand	3,480	2,770
Wine barrels	.....	7
Total	3,680	3,177

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O O 11.

IMPROVEMENT OF BLACK RIVER AT PORT HURON, MICHIGAN.

The present approved project for the improvement of this river was completed in 1893.

The work which has been in progress at this locality during the past fiscal year has been for maintenance of the improved channel. The dredging plant of the Muir-O'Sullivan Dredge and Dock Company, of Port Huron, Mich., was hired by lease, dated August 19, 1907, at $13 per hour, for the purpose of doing this work. Operations were begun on August 10, 1907, and continued until October 15, 1907. The dredge worked a total of 384 hours and 30 minutes and removed 22,449 cubic yards, scow measurement. The shoals which had formed were removed from the river, and a channel with a depth of 16 feet and a minimum width of 60 feet was provided from Military Street Bridge to a point opposite the dock of the Michigan Sulphite Fiber Works.

Original estimated cost of 16-foot channel, 1891	$75,000.00
Whole amount expended to June 30, 1908	52,372.06

Money statement.

July 1, 1907, balance unexpended	$6,015.60
June 30, 1908, amount expended during fiscal year for maintenance of improvement	5,387.66
July 1, 1908, balance unexpended	627.94
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	6,000.00

Submitted in compliance with the requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

September 19, 1890	$25,000	March 3, 1899	$4,000
July 13, 1892	10,000	March 2, 1907	6,000
August 18, 1894	4,000		
June 3, 1896	4,000	Total	53,000

CONTRACT IN FORCE.

Name of contractor: Muir-O'Sullivan Dredge and Dock Company, Port Huron, Mich.
Character of work: Dredging by means of leased plant.
Price: $13 per working hour.
Dated: August 19, 1907.
Date of beginning work: August 10, 1907.
Date of completion: October 15, 1907.

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COMMERCIAL STATISTICS.

Receipts, by vessel, for the calendar year ended December 31, 1907.

[Compiled from statements furnished by Mr. J. L. Preston, special deputy collector of customs, Port Huron, Mich.]

Articles.	Received.	Articles.	Received.
	Tons.		*Tons.*
Brick	500	Pulp wood	31,250
Cedar posts	800	Shingles	1,564
Coal	57,687	Wood	180
Gravel	62,000		
Lath	905	Total	168,152
Lumber	13,266		

O O 12.

OPERATING AND CARE OF ST. CLAIR FLATS CANAL, MICHIGAN.

During the fiscal year the custodian, with two assistants, has continued the routine work of enforcing rules, care of grounds and property, and keeping records.

The amount of commerce passing through the canal during the season of 1907 was 66,271,962 tons, having an estimated value of $648,802,508.

Summary of expenditures for operating and care of St. Clair Flats Canal, Michigan, for the fiscal year ending June 30, 1908.

Pay rolls, including supervision of canal, care of grounds, repairs to piers, etc	$3,809.70
Repair material and nonpersonal services	2,207.70
Contingencies	3,077.41
Total	9,094.81

Statement of expenditures for operating and care of St. Clair Flats Canal, Michigan.

1882	$8,778.59	1897	$2,375.89
1883	5,118.47	1898	2,056.53
1884	3,090.65	1899	2,049.75
1885	4,274.16	1900	3,916.30
1886	10,171.54	1901	2,860.23
1887	1,819.53	1902	2,314.97
1888	1,510.00	1903	3,912.11
1889	20,070.00	1904	16,875.66
1890	2,403.16	1905	28,823.79
1891	1,845.20	1906	7,528.22
1892	1,866.67	1907	15,673.61
1893	2,697.93	1908	9,094.81
1894	3,586.18		
1895	1,999.32	Total	169,001.76
1896	2,288.49		

The above amounts represent the actual expenditures, and in no case include the outstanding liabilities, which for the fiscal year 1908 amount to $456.23.

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O O 13.

IMPROVEMENT OF CLINTON RIVER, MICHIGAN.

The work of dredging which was in progress on this river at the beginning of the present fiscal year, under a lease with the Toledo Dredge and Dock Company, of Toledo, Ohio, dated June 17, 1907, for the hire of a dredging plant at $20 per hour, was continued until the termination of the lease on July 16, 1907. More shoaling was encountered than had been expected, and when the $5,000 provided for under the first lease with the Toledo Dredge and Dock Company was exhausted on July 16 there was still some distance to be covered before the city docks would be reached. As there were still sufficient funds on hand to do the extra work, a second lease, dated July 17, 1907, was entered into with the Toledo Dredge and Dock Company for the hire of the same plant at the same price per hour, and the work of dredging was continued until a ledge of bowlders, extending across the river, was encountered at the end of Tucker's coal dock in the city of Mount Clemens. As the dredge employed was a suction dredge, it could make no progress through this ledge, and operations were necessarily discontinued on July 23, 1907. As a result of the work which was done on this river a channel fully 8 feet in depth and from 80 to 100 feet in width was secured in the river from the mouth to Tucker's coal dock.

Original estimated cost of work, 1885, as amended 1899	$34,564.00
Whole amount appropriated and expended prior to adoption of present project	25,500.00
Whole amount expended on present project to June 30, 1908	54,228.72

Money statement.

July 1, 1907, balance unexpended	$7,252.31
June 30, 1908, amount expended during fiscal year for maintenance of improvement	6,417.03
July 1, 1908, balance unexpended	835.28
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 30, 1852	$5,000	July 13, 1892	$3,564
July 11, 1870	5,000	August 18, 1894	5,000
March 3, 1871	1,500	June 3, 1896	10,000
March 3, 1881	8,000	March 3, 1905	3,000
August 2, 1882	6,000	March 2, 1907	2,500
August 5, 1886	6,000		
August 11, 1888	10,000	Total	80,564
September 19, 1890	10,000		

CONTRACT IN FORCE.

Name of contractor: The Toledo Dredge and Dock Company, Toledo, Ohio.
Character of work: Dredging by means of leased dredging plant.
Price: $20 per hour.
Dated: June 17, 1907, and July 17, 1907.
Dates of beginning: June 18, 1907, and July 17, 1907.
Dates of expiration: July 17, 1907, and July 23, 1907.

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COMMERCIAL STATISTICS.

Receipts and shipments by vessel for the calendar year ended December 31, 1907.

[Compiled from statements furnished by Mr. A. Smith, special deputy collector of customs.]

Articles.	Received.	Shipped.	Articles.	Received.	Shipped.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Brick	3		Lumber	2,075	
Cedar posts	28		Sand	1,096	336
Coal	13,720		Shingles	9	
Headings and hoops		11	Staves		686
Lath	105				
Logs	6,237		Total	23,273	1,033

O O 14.

IMPROVEMENT OF DETROIT RIVER, MICHIGAN.

The work in progress on this river is that in accordance with plan A, the Amherstburg channel, authorized by the river and harbor acts of March 3, 1905, and March 2, 1907, which provides for a channel with at least 600 feet width and a depth of 21 feet below a Lake Erie stage of 571 (levels of 1903) feet, from Detroit to Lake Erie, and that in accordance with plan B, the Livingstone channel, authorized by the river and harbor act of March 2, 1907, which provides for a second channel at the mouth of the Detroit River to be 22 feet deep at the same stage, 300 feet wide from Grosse Isle to Bar Point and 800 feet thence to deep water in Lake Erie, as shown on the accompanying map.

AMHERSTBURG CHANNEL.

During the past fiscal year work on this channel has been prosecuted under five separate contracts as follows:

Limekiln Crossing.—Under formal contract dated March 29, 1907, Dunbar & Sullivan Dredging Company began work on May 24, 1907, and, except between December 18, 1907, and March 19, 1908, operations were continued. There was removed limestone bed rock to the extent of 44,965 cubic yards full rate (above 22 feet grade), 53,417 cubic yards half rate (between 22 and 24 feet grades), and 34,264 cubic yards no payment (below 24 feet grade). Drilling and blasting was done to the extent of 250,462 linear feet of holes drilled and 336,104 pounds of dynamite used. The total amount of material removed to June 30, 1908, was 46,170 cubic yards full rate, 54,890 cubic yards half rate, and 34,264 cubic yards no payment; and the total amount earned by the contractors was $279,737. About 75 per cent of the work at this section has been completed.

Bois Blanc Island range.—Under formal contract dated October 1, 1906, Dunbar & Sullivan Dredging Company began work on September 25, 1906, and operations were continued until October 30, 1907, when the contract was completed. There was removed clay and bowlders to the extent of 7,590 cubic yards full rate (above 22 feet grade), 32,427 cubic yards half rate (between 22 and 24 feet grades), and 231 cubic yards no payment (below 24 feet grade.) The total amount of material removed under this contract was 225,340 cubic yards full rate, 75,297 cubic yards half rate, and 30,771 cubic

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yards no payment; and the total amount earned by the contractors was $52,268.96. Within the area covered by this contract, the required 21 feet depth was everywhere secured except within an area 100 feet square at the south end where the least depth over bed rock is about 20 feet. The overlying material was removed, but the contract did not require the removal of bed rock.

Amherstburg reach.—Under formal contract dated May 31, 1904, M. Sullivan began work on May 24, 1904. The contract time expired July 31, 1907, but the work being then incomplete, the time limit was waived. Operations were continued until September 12, 1907, when the contract was completed. There was removed limestone bed rock, bowlders, clay, and sand to the extent of 534 cubic yards full rate (above 22 feet grade), 890 cubic yards half rate (between 22 and 24 feet grades), and 656 cubic yards no payment (below 24 feet grade). The total amount of material removed under this contract was 167,202 cubic yards full rate, 291,998 cubic yards half rate, and 98,291 cubic yards no payment; and the amount earned by the contractor was $751,682.40.

Hackett range.—Under formal contract dated September 20, 1907, for furnishing and operating dredge *No. 3*, G. H. Breymann & Bro. began work on September 26, 1907, and, except between December 21, 1907, and April 1, 1908, continued operations until May 20, 1908, when the contract was completed. The dredge worked 1,564½ hours, was delayed 250½ hours, and removed 47,028 cubic yards, scow measurement, of bowlders, clay, and sand. The amount earned by the contractors was $39,112.50.

Also, under formal contract dated September 24, 1907, for furnishing and operating dredges *Old Glory* and *Gladiator*, M. Sullivan began work on September 6, 1907, with *Old Glory* and on October 7, 1907, with *Gladiator*, and, except between December 21, 1907, and March 22, 1908, continued operations to May 8, 1908, with *Gladiator* and to May 31, 1908, with *Old Glory*. The contract is completed, except for the removal of ridges which will be developed during the work of cleaning up by derrick scow with diving plant operated by hired labor. The material removed was bowlders, clay, and sand. The *Gladiator* worked 1,250$\frac{5}{7}$ hours, was delayed 272⅔ hours, and removed 53,617 cubic yards, scow measurement; and the *Old Glory* worked 1,398¼ hours, was delayed 246 hours, and removed 52,915 cubic yards, scow measurement. The amount earned by the contractor to June 30, 1908, was $59,225.42.

A derrick scow with diving plant belonging to the United States was operated by hired labor between April 21 and June 30, 1908, and engaged in removing bowlders projecting above the required 21 feet depth within the areas improved by dredging plants. The area thus improved was about 175,000 square yards, and 570 cubic yards of bowlders were removed at a cost of $2,965, or $5.20 per cubic yard.

Bar Point shoals.—Under formal contract dated March 2, 1905, G. H. Breymann & Bros. began work on April 20, 1905, and operations were continued until September 26, 1907, when the contract was completed. There was removed sand, clay, silt, bowlders, and hardpan to the extent of 26,974 cubic yards, scow measurement. The total material removed under this contract was 1,424,281 cubic yards, scow measurement, full rate (above 23 feet grade), and 41,669

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cubic yards no payment (below 23 feet grade); and the amount earned by the contractors was $386,127.74.

The amount expended on this channel to June 30, 1908, is $3,697,017.71, none of which has been applied to maintenance, and as a result of this expenditure there is a channel 21 feet deep below 571 and of a minimum width of 600 feet, except at the following places: From a point 1 mile south of Fighting Island to the head of Limekiln Crossing there is a depth of but 19.2 feet; along the upper 3,500 feet of the Limekiln Crossing section the improvement to projected depth has been completed for a channel width of 450 feet, with work in progress on the remaining 150 feet; at the lower end of the Limekiln Crossing section there is a point of bed rock 100 square feet in area where there is but 20 feet depth; along Hackett range for a distance of 1¼ miles the channel is completed for a width of 300 feet, with work progressing on the remaining half of the channel, and from the end of this section to 1 mile south of Bar Point there is but 20 feet of water, which section is included in the estimate but the money has not yet been authorized for its improvement; from there to Lake Erie the channel is completed to a width of 400 feet.

The improvement of Ballards reef section and Bar Point section is included in the estimate for the work, but work can not be advantageously done on Ballards reef until the opening of the entire Livingstone channel to navigation. The Bar Point section can be advantageously dredged upon completion of section 4 of the Livingstone channel, and as this section should be completed at the end of this season or early next season, it is considered advisable to begin work at that time. Two hundred and fifty thousand dollars in addition to available balance can be profitably expended by June 30, 1910.

LIVINGSTONE CHANNEL.

Section 1.—Under formal contract dated October 31, 1907, Great Lakes Dredge and Dock Company began work on December 7, 1907, and, except between December 15, 1907, and April 5, 1908, operations were continued. There was removed limestone bed rock, bowlders, and clay to the extent of 5,923 cubic yards full rate (above 22 feet grade) and 3,949 cubic yards half rate (between 22 and 24 feet grades). Drilling and blasting was done to the extent of 20,479 linear feet of holes drilled and 21,410 pounds of dynamite used. The amount earned by the contractors was $15,637.05, and about 3 per cent of the work has been performed.

Section 2.—Under formal contract dated November 1, 1907, Grant Smith & Co. and Locher began work on April 14, 1908, and operations were continued. There was removed clay and bowlders, classified as "earth," to the extent of 61,709 cubic yards full rate (above 22 feet grade) and 3,961 cubic yards half rate (between 22 and 24 feet grades). Also, 66,851 cubic yards of material have been placed in the cofferdam which has been built to the water surface for a length of 6,400 feet. The material entering into this cofferdam is clay and broken rock excavated from this section and from Item B, Limekiln Crossing. The amount earned by the contractors was $38,213.70, and about 3 per cent of the work has been performed.

Section 3.—Under formal contract dated December 23, 1907, P. B. McNaughton and O. E. Dunbar began work on April 9, 1908, and

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operations were continued. There was removed clay, sand, and bowlders, classified as "earth," to the extent of 156,902 cubic yards full rate (above 22 feet grade), 29,065 cubic yards half rate (between 22 and 24 feet grades), and 7,287 cubic yards no payment (below 24 feet grade); also, limestone bed rock to the extent of 8,282 cubic yards full rate and 920 cubic yards half rate. Drilling and blasting was done to the extent of 31,182 linear feet of holes drilled and 45,282 pounds of dynamite used. The amount earned by the contractors was $110,194.85. About 4 per cent of the work has been performed.

Section 4.—Under formal contract dated July 24, 1907, G. H. Breymann & Bros. began work on July 17, 1907, and, except between December 12, 1907, and April 3, 1908, operations were continued. There was removed sand, clay, silt, bowlders, and hardpan to the extent of 2,220,306 cubic yards, scow measurement. The amount earned by the contractors was $566,178.03, and about 65 per cent of the work has been performed.

There has been expended on this channel to June 30, 1908, $513,818.90, none of which has been applied to maintenance. As a result of the work done on section 4 of this project there is in use a channel 18.2 feet deep from the old channel by the east route to Lake Erie, with work in progress to complete the channel to the projected depth and width. The rest of the channel is closed to navigation.

In addition to the work outlined above, which is in accordance with the present authorized project, there is a section of the channel between Detroit and Lake Erie of about 5 miles in length, lying between Fighting Island and the city of Wyandotte, which should be improved. The widths and depths of the natural channel along this section are sufficient, but passing vessels are required to make five changes of direction in navigating this short stretch, and as a consequence many collisions have occurred there. It is thought that the expenditure of about $420,000 would secure a straight channel 800 feet wide through this section, but as this work has never been authorized by Congress this estimated cost is not included in the amount required to complete existing projects, nor in the estimate of the amount which can be profitably expended in the fiscal year 1910.

Surveys.—The areas improved under existing contracts and by hired labor have been examined from time to time by means of the sweeping raft as a means of inspection to determine that the required clear depth has been secured. Other portions of the channel were also examined to locate obstructions to navigation. The area thus surveyed was about 1,200,000 square yards, at a cost of about $1,800.

As the progress of the work required, stakes were driven in the water and ranges established on shore marking the limits of areas under improvement and of dumping grounds.

At various times between July 1 and December 15, 1907, and between April 15 and June 30, 1908, surveys were made by means of boats and sounding raft for the purpose of determining amounts of material removed and to be removed under existing contracts. The number of soundings taken was 147,000, at a cost of $4,560, being $3\frac{1}{10}$ cents per sounding. Also, during January and February, 1908, an ice survey was made to determine amounts of material under

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existing contracts. The number of soundings taken in this manner was 85,100, at a cost of $1,915, being 2¼ cents per sounding.

Tug service.—On account of plant operated by hired labor, tug service was necessary as follows: Between July 1 and December 19, 1907, by tug *Pallister*, 144½ days, at $25 per day, $3,612.50; between December 30, 1907, and January 3, 1908, and March 24 and April 6, 1908, by tug *W. B. Aldrich*, 16 days, at $25 per day, $400; and between April 7 and June 30, 1908, by tug *John E. Monk*, 72 days, at $25 per day, $1,800; being a total for tug service of $5,812.50.

Groundings and collisions.—During the year a number of vessels went aground on the sides of the channel at the mouth of Detroit River, and still others were injured by striking bowlders or other obstructions, but were not detained. The accidents which resulted most seriously were as follows: On July 12, 1907, the steamer *D. R. Hanna* went aground on the east bank of Limekiln Crossing, completely blocking that channel until the steamer was released one day later. During this time all vessels used the 300-foot channel to the westward, which at other times was used by downbound vessels only. On August 27, 1907, the steamer *Isaac L. Ellwood* was sunk in collision with the steamer *A. G. Brower* at Bar Point. The *Ellwood* did not seriously obstruct navigation and was removed September 16, 1907. On September 10, 1907, the schooner *G. G. Houghton*, in tow of the tug *American Eagle*, was sunk at Bar Point during a severe storm. The *Houghton* did not obstruct navigation, was abandoned to the Canadian government, and was removed by the Reid Wrecking Company, of Sarnia, Ontario, on June 27, 1908. On October 5, 1907, the tug *Excelsior* was run down by the steamer *Presque Isle* and sunk in the channel near the foot of Bois Blanc Island. The *Excelsior* partially obstructed navigation until her removal on October 16, 1907. Also on October 16, 1907, the steamer *Case* was sunk in the channel near the head of Bois Blanc Island when in collision with the steamer *Mariska*. The *Case* seriously obstructed navigation until her removal on October 23, 1907.

Water gauge readings.—The permanent automatic water gauge at the mouth of Detroit River was attended to regularly during the year, and the record derived therefrom is as follows:

Month.	1. Mean stage.	2. Maximum stage.	3. Minimum stage.	4. Mean depth.	5. Maximum depth.	6. Minimum depth.
1907.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
July	573.63	574.35	572.72	21.83	22.55	20.92
August	573.41	574.19	572.42	21.61	22.39	20.62
September	573.10	574.90	571.02	21.30	23.10	19.22
October	572.82	573.60	571.75	21.02	21.80	19.95
November	572.53	574.00	570.68	20.73	22.20	18.88
December	572.39	573.92	571.12	20.59	22.12	19.32
1908.						
January	572.70	574.74	571.12	20.90	22.94	19.32
February	572.28	573.49	570.11	20.48	21.69	18.31
March	572.90	574.32	571.51	21.10	22.52	19.71
April	573.39	574.90	571.20	21.59	23.10	19.40
May	573.75	575.08	571.71	21.95	23.28	19.91
June	573.77	575.00	572.98	21.97	23.20	21.18

In the above table columns 1, 2, and 3 give elevations above mean tide at New York, levels of 1903, and columns 4, 5, and 6 give the depths at Ballards reef, this being at present the place of least depth

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in lower Detroit River for downbound vessels. For upbo
sels, the place of least depth is at Bar Point shoals, and
to October 1, 1907, also for downbound vessels. For such
foot should be deducted from the depths given. Also, fro
1907, until the end of that season, the place of least depth for
vessels was at Limekiln Crossing east channel, and for su
2 feet should be deducted from depths.

The highest stage during the year was 575.08 (23.28 fe
on May 14, 1908; and the lowest stage was 570.11 (18.31 fe
on February 1, 1908; and the extreme yearly fluctuation
feet. The month of greatest fluctuation was September 1
feet), and the month of least fluctuation was July, 1907 (1.
The greatest fluctuations during short periods of time we
lows: 2.42 feet in 8 hours on September 12, 1907; 2.48 f
hours on January 12, 1908; 2.70 feet in 16 hours on February
2.13 feet in 7 hours on March 16, 1908, and 3.02 feet in 13
April 1, 1908.

The commerce passing through the Detroit River during
gation season of 1907 amounted to 71,226,895 tons, as sho
commercial statistics appended hereto.

Money statements.

GENERAL IMPROVEMENT.

July 1, 1907, balance unexpended	
Amount appropriated by sundry civil act approved May 27, 1908	
June 30, 1908, amount expended during fiscal year, for works of improvement	[a]
July 1, 1908, balance unexpended	
July 1, 1908, outstanding liabilities	
July 1, 1908, balance available	
July 1, 1908, amount covered by uncompleted contracts	
Amount (estimated) required for completion of existing project	1,3
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

LIVINGSTONE CHANNEL.

July 1, 1907, balance unexpended	$2,06
Amount appropriated by sundry civil act approved May 27, 1908	57
	2,57
June 30, 1908, amount expended during fiscal year, for works of improvement	[b] 51
July 1, 1908, balance unexpended	2,06
July 1, 1908, outstanding liabilities	25
July 1, 1908, balance available	1,80

[a] Actual expenditures during the fiscal year were $509,220.28; from which $0.77 (refundment) and $51 (proceeds of sale) have been deducted, leaving expenditures $509,168.51.

[b] Includes $5,833.33 transferred by Treasury Department to appropria "Survey of N. & N. W. Lakes," for sweeping raft.

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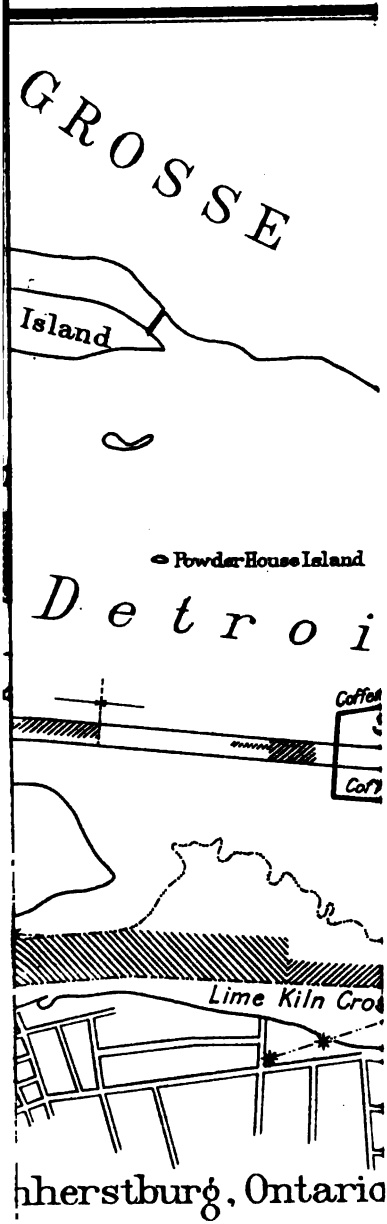

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July 1, 1908, amount covered by uncompleted contracts	$5,116,028.00
Amount (estimated) required for completion of existing project	4,095,950.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	2,500,000.00

APPROPRIATIONS.

June 23, 1874	$25,000	June 6, 1900	$200,000
June 18, 1878	100,000	March 3, 1901	325,000
March 3, 1879	50,000	June 13, 1902	500,000
June 14, 1880	50,000	June 28, 1902	136,500
March 3, 1881	50,000	March 3, 1903	450,000
August 2, 1882	60,000	March 3, 1905	500,000
July 5, 1884	200,000	June 30, 1906	700,000
August 5, 1886	37,500	March 2, 1907	150,000
August 11, 1888	130,500		2,000,000
July 13, 1892	30,000	May 27, 1908	150,000
August 18, 1894	30,000		575,000
June 3, 1896	30,000		
March 3, 1899	100,000	Total	6,579,500

CONTRACTS IN FORCE.

GENERAL IMPROVEMENT.

AMHERSTBURG CHANNEL.

CONTRACT DATED MAY 31, 1904.

Name of contractor: M. Sullivan, Buffalo, N. Y.
Amount and character of work: $751,682.40; dredging section 4. Amherstburg reach and Hackett range.
Price per unit: $2.40 per cubic yard, bank measurement (full rate), and $1.20 per cubic yard, bank measurement (half rate).
Date of approval: June 13, 1904.
Date of beginning work: August 15, 1904.
Date of completion: September 12, 1907.

CONTRACT DATED MARCH 2, 1905.

Name of contractor: G. H. Breymann & Bros., Toledo, Ohio.
Amount and character of work: $386,127.74; dredging at Bar Point shoals.
Price per unit: 27 cents per cubic yard, scow measurement.
Date of approval: March 17, 1905.
Date of beginning work: May 20, 1905.
Date of completion: September 26, 1907.

CONTRACT DATED OCTOBER 1, 1906.

Name of contractor: Dunbar & Sullivan Dredging Company, Buffalo, N. Y.
Amount and character of work: $52,268.96; dredging at section 3, Bois Blanc Island range.
Price per unit: 19⅞ cents per cubic yard, bank measurement (full rate), and 9 11/16 cents per cubic yard, bank measurement (half rate).
Date of approval: October 17, 1906.
Date of beginning work: April 16, 1907.
Date of completion: October 30, 1907.

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CONTRACT DATED MARCH 29, 1907.

Name of contractors: Dunbar & Sullivan Dredging Company, Buffalo, N. Y.
Amount and character of work: $384,000 (estimated); dredging at item B, Lime-kiln Crossing.
Price per unit: $3.80 per cubic yard, bank measurement (full rate), and $1.90 per cubic yard, bank measurement (half rate).
Date of approval: April 19, 1907.
Date of beginning work: June 19, 1907.
Date of expiration: About June 10, 1909 (375 good working days).

EMERGENCY CONTRACT DATED APRIL 10, 1907.

Name of contractor: L. S. Sullivan, Toledo, Ohio.
Amount and character of work: $4,900 (estimated); hire of tug *Pallister*.
Price per unit: $25 per day.
Date of beginning work: April 15, 1907.
Date of expiration: About December 19, 1907.

CONTRACT DATED SEPTEMBER 20, 1907.

Name of contractor: G. H. Breymann & Bro., Toledo, Ohio.
Amount and character of work: $39,112.50, hire of dredging plant.
Price per unit: $25 per hour.
Date of approval: October 19, 1907.
Date of beginning work: November 4, 1907.
Date of completion: May 28, 1908.

CONTRACT DATED SEPTEMBER 24, 1907.

Name of contractor: M. Sullivan, Buffalo, N. Y.
Amount and character of work: $59,225.42; hire of two dredging plants.
Price per unit: $20 and $25 per hour.
Date of approval: October 19, 1907.
Date of beginning work: November 4, 1907.
Date of expiration: Indefinite (100 good working days).

EMERGENCY CONTRACT DATED APRIL 4, 1908.

Name of contractor: Hackett & Crumrine, Detroit, Mich.
Amount and character of work: $5,200; hire of tug.
Price per unit: $25 per day.
Date of beginning work: April 14, 1908.
Date of expiration: About December 15, 1908.

LIVINGSTONE CHANNEL.

CONTRACT DATED OCTOBER 31, 1907.

Name of contractor: Great Lakes Dredge and Dock Company, Chicago, Ill.
Amount and character of work: $673,200; dredging at section 1.
Price per unit: $1.98 per cubic yard, bank measurement.
Date of approval: December 19, 1907.
Date of beginning work: April 15, 1908.
Date of expiration: About September 15, 1910 (600 good working days).

CONTRACT DATED NOVEMBER 1, 1907.

Name of contractor: Grant Smith & Company and Locher, Thorice, Mich.
Amount and character of work: $1,578,440; rock and earth excavation at section 1.
Price per unit: For cofferdam, $25,000; inside cofferdam rock, at $1.24 per cubic yard, earth 60 cents per cubic yard; outside cofferdam, rock $3.40 per cubic yard, earth 60 cents per cubic yard; removal of pier, $5,000.
Date of approval: December 23, 1907.
Date of beginning work: April 15, 1908.
Date of expiration: About August 1, 1911.

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CONTRACT DATED DECEMBER 23, 1907.

Name of contractor: P. B. McNaughton and O. E. Dunbar, Buffalo, N. Y.
Amount and character of work: $2,700,750; rock and earth excavation at section 3.
Price per unit: 50 cents per cubic yard, bank measurement, for earth, and $2.80 per cubic yard, bank measurement, for rock.
Date of approval: January 8, 1908.
Date of beginning work: April 15, 1908.
Date of expiration: 750 good working days.

CONTRACT DATED JULY 24, 1907.

Name of contractor: G. H. Breymann & Bros., Toledo, Ohio.
Amount and character of work: $895,500; dredging at section 4.
Price per unit: 25½ cents per cubic yard, scow measurement.
Date of approval: August 30, 1907.
Date of beginning work: November 15, 1907.
Date of expiration: 500 good working days.

COMMERCIAL STATISTICS.

STATISTICS OF LAKE COMMERCE PASSING THROUGH THE DETROIT RIVER, MICHIGAN DURING THE SEASON OF 1907.

[Compiled from official records at Detroit, Mich.]

SOURCES OF INFORMATION FOR TRAFFIC DATA AND VALUATIONS.

The number and class of vessels and the number of passages have been taken from the custom-house and post-office records at Detroit. The registered tonnage is taken from the American and Canadian Blue Books. The determination of the actual freight carried is based upon the assumption that the ratio between actual freight and registered tonnage is the same for Detroit River that it is for St. Marys Falls Canals. The valuation of the freight is based upon the assumption that the value of the freight passing the Detroit River is the same per ton as that passing St. Marys Falls Canals. The valuation of the vessels was taken from Lloyds Register and Great Lakes Register.

The commerce of the Detroit River during the past six years exceeds that of the St. Marys Falls Canals by about 27 per cent.

The following compilation has been made from data similar to those used since 1902, viz, the marine post-office record of vessels passing through the Detroit River and the custom-house records of vessels stopping at Detroit. The Detroit postmaster, Mr. Homer Warren, has permitted the record of vessels passing Detroit River to be copied, while the record of those stopping was obtained from the collectors of customs at Detroit, Windsor, and Amherstburg. After the lists were completed the net registerd tonnage was copied from the American and Canadian Blue Books and summed. The ferry boats plying between Detroit, Windsor, and Belle Isle and the dredging plants at Amherstburg and Detroit are not included.

The passages are collected and summed as follows:

1907.	Number of vessels.	Net registered tonnage.	1907.	Number of vessels.	Net registered tonnage.
January	24	832	August	4,958	7,950,903
February	2	40	September	4,587	7,520,306
March	92	12,491	October	4,598	7,998,348
April	1,862	2,199,114	November	3,496	5,360,150
May	4,301	6,732,725	December	714	1,011,159
June	4,708	7,906,561			
July	4,807	7,267,140	Total	34,149	53,959,769

The actual freight is obtained by comparison with the tonnage of St. Marys Falls Canal where records of both net registered and actual freight are kept. During the season of 1907 the actual freight passing St. Marys Falls Canal was 32 per cent greater than the net registered tonnage. Assuming this ratio for the commerce of Detroit River, the actual freight would be 71,226,895 tons of 2,000 pounds each. The com-

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merce using the St. Clair Flats Canal is less than that of the Detroit River. It is found from the customs-house records that 3,768,737 net registered tons that used the Detroit River do not go through the canal but turn around and go back down the river. This should be subtracted from the Detroit River tonnage. There is a small amount of business done at Lake St. Clair ports which does not go through the Detroit River, of which we have no actual record, but which is estimated by the custodian to aggregate 15,000 net registered tons during the season. This should be added to the Detroit River tonnage. Making the corrections, the commerce using the St. Clair Flats Canal during the season of 1907 is found to be 50,206,032 net registered tons, or 66,271,962 actual freight tons. The value of the freight passing St. Marys Falls Canal during the season of 1907 was found to be $9.79 per ton. Assuming this unit value of the Detroit River commerce, then the total value of actual freight passing Detroit River during the season of 1907 would be $697,311,302. The commerce passing Detroit River has now been determined with accuracy for six consecutive years as follows:

Year.	Number of passages.	Net registered tons.	Actual freight.	Value.
1902	33,000	39,328,689	44,260,506	$440,834,040
1903	33,113	37,453,796	46,817,245	471,917,891
1904	29,472	33,059,984	42,792,326	453,598,656
1905	35,599	45,912,622	55,508,360	522,888,751
1906	35,128	50,673,897	63,808,571	662,971,063
1907	34,149	53,959,769	71,226,895	697,311,302

The actual freight is 7,418,324 tons greater than in 1906. The number of vessel passages has decreased 979. There were 902 steam vessels that used the Detroit River during the season of 1907. Of these there were 794 the registered tonnage of which exceeded 100 tons. The average tonnage of these 794 large steam vessels was 2,077 net registered tons. There were 277 sail vessels having a tonnage greater than 100 tons. Their tonnage was 914 tons.

GENERAL SUMMARY.

DETROIT RIVER.

Total net registered tons	53,959,769
Actual freight carried ..... tons	71,226,895
Valuation placed on freight	$697,311,302
Total number of vessels	1,215
Number of American vessels	1,070
Number of Canadian vessels	145
Number of steam vessels	902
Number of sail vessels	313
Valuation of steam vessels	$111,371,000
Valuation of sail vessels	$7,486,500
Total valuation of vessels	$118,857,500

ST. CLAIR FLATS CANAL.

Total net registered tons	50,206,032
Actual freight ..... tons	66,271,962

O O 15.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

Wreck of steamer Linden.—This vessel was sunk June 23, 1905, while in collision with the steamer *City of Rome*. The collision occurred in the St. Clair River at a point about 1 mile above Tashmoo Park. After the failure of the Myers Wrecking Company, contractors, to remove the wreck, their bond of $500 was forfeited and a second contract was made with the Port Huron Transportation and

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Wrecking Company, who agreed to remove the wreck for the title to vessel and cargo. These contractors succeeded in lifting the wreck, but while proceeding downstream with it one of the pontons sank and the wreck again settled on the bottom, but out of the regular track of vessels. Work on the wreck was resumed by the contractors in March, 1907, and continued until September 1, 1907, when the wreck was satisfactorily removed. The only expense was $1.25, the cost of a visit to the locality by an inspector.

Wreck of steamer Eliza H. Strong.—In October, 1904, this steamer sank in Lake Huron, 4,433 feet from the southeast corner of the dock at Lexington, Mich., while being towed from that point to Port Huron. As the wreck was an obstruction to vessels doing a coasting business its removal was deemed essential, and an allotment of $1,000 for that purpose was made on June 28, 1905. Shortly after this the underwriters who had charge of the wreck stated that they had entered into contract to remove it.

It is understood that the boilers and machinery have been removed, and that the contractors are only waiting for favorable weather to blow up the hull with dynamite. During the spring of 1907 the wreck was marked by a spar buoy.

Wreck near Thunder Bay Island, Lake Huron.—The U. S. Lake Survey steamer *Search*, while sweeping the region north of Thunder Bay Island, Lake Huron, discovered a wreck lying in 30 feet of water, 7¼ miles SE. ½ S. from Middle Island light-house and 4⅞ miles N. by W. ¼ W. from Thunder Bay Island light-house. The wreck appeared to be that of a good-sized schooner or barge with deck and upper works gone. It lay east and west with 19½ feet of water over it.

This wreck was removed to a depth of 24 feet by blasting, during the month of July, 1907, at a total cost of $1,000 by the crew of the U. S. steamer *Hancock*.

Wreck of steamer Fred Pabst.—This steamer was sunk on October 11, 1907, as a result of collision with the steamer *Lake Shore* in the St. Clair River, opposite Fort Gratiot. An examination showed the wreck to be 240 feet east of the Fort Gratiot sailing ranges, and as boats could safely pass and the wreck lay wholly within Canadian territory no action by the United States was necessary. The vessel was raised on February 1, 1908, and towed to dock at Sarnia. One hundred and fifty dollars was expended, covering the expenses of an examination and patrol duty by tug and by the U. S. steamer *Hancock*.

Wreck of schooner Montpelier.—This vessel sank on August 10, 1907, near the lower end of Belle Isle, in the Detroit River. At the time of sinking it was loaded with about 700 tons of soft coal, and this cargo was removed and the wreck abandoned by the owner. An allotment of $2,000 was made for its removal and contract made with the Port Huron Transportation and Wrecking Company, of Port Huron, Mich., at a cost of $800. The wreck was completely removed May 29, 1908, at a total cost of $800.

Wreck of schooner Albany.—During the month of March, 1908, this vessel was broken from her moorings in the Belle River, Michigan, by the ice and sunk across the channel. At the time of sinking there were some thirty boats in winter quarters in the Belle River above the wreck and all but the smaller ones were blocked in the river. The boat was formally abandoned by its owner. An allotment of

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$1,000 was made for its removal and letter requesting prices addressed to all the principal wreckers in this vicinity. The Port Huron Transportation and Wrecking Company's price of $400 being the lowest was accepted on March 30, 1908, and the work of removal was completed on April 5, 1908. Total cost, $445.73.

CONTRACTS IN FORCE.

EMERGENCY CONTRACT DATED NOVEMBER 21, 1905.

Name of contractor: Port Huron Transportation and Wrecking Company, Port Huron, Mich.
Amount and character of work: Title to vessel and cargo; removal of wrecked steamer *Linden*.
Price: Title to vessel and cargo.
Date of beginning of work: December 1, 1905.
Date of completion: September 1, 1907.

EMERGENCY CONTRACT DATED MAY 7, 1908.

Name of contractor: Port Huron Transportation and Wrecking Company, Port Huron, Mich.
Amount and character of work: $800; removal of wreck schooner *Montpelier*.
Date of beginning work: May 17, 1908.
Date of completion: May 29, 1908.

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APPENDIX P P.

IMPROVEMENT OF RIVERS AND HARBORS IN THE CLEVELAND, OHIO, DISTRICT.

REPORT OF LIEUT. COL. JOHN MILLIS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Toledo Harbor, Ohio.
2. Port Clinton Harbor, Ohio.
3. Sandusky Harbor, Ohio.
4. Huron Harbor, Ohio.
5. Vermilion Harbor, Ohio.
6. Lorain Harbor, Ohio.
7. Cleveland Harbor, Ohio.
8. Fairport Harbor, Ohio.
9. Ashtabula Harbor, Ohio.
10. Conneaut Harbor, Ohio.
11. Removing sunken vessels or craft obstructing or endangering navigation.

UNITED STATES ENGINEER OFFICE,
Cleveland, Ohio, July 18, 1908.

SIR: I have the honor to forward herewith annual reports for works in my charge for fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

JOHN MILLIS,
Lieut. Col., Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

P P 1.

IMPROVEMENT OF TOLEDO HARBOR, OHIO.

For an account of early history and projects of improvements, see pages 2614 to 2616, Report of Chief of Engineers, 1898, and for latest projects see pages 3020 and 3021, Report of Chief of Engineers, 1899.

For a statement and estimate of cost of the project of 1899 and maps showing the limits of "divisions" into which the work is separated see Report of Chief of Engineers, 1898, pages 2693 to 2705. An accurate map of the harbor of Toledo was published in the Report of Chief of Engineers, 1901.

No contract work has been done at Toledo Harbor during the year.

The U. S. dredge *Burton* was engaged on maintenance work from July 1 to December 5, 1907, April 8 to 25, 1908, and June 26 to 30, 1908.

A total of 20,549 cubic yards of material was removed from the Maumee River between Ash and Magnolia streets, and 381,979 cubic yards from the straight channel, all at a field cost of $26,356.67.

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During the winter the dredge *Maumee*, tug *Spear*, and scows were overhauled at Port Clinton at a cost of $10,109.90, and the U. S. dredge *Burton* was overhauled at Sandusky, Ohio, at a cost of $5,864.22.

The two 500-cubic-yard dump scows under construction at Port Clinton, Ohio, were completed in October and November, 1907.

Money statement.

July 1, 1907, balance unexpended	$113,626.93
Receipts from sales	41.25
	113,668.18
June 30, 1908, amount expended during fiscal year for maintenance of improvement	40,576.38
July 1, 1908, balance unexpended	73,091.80
July 1, 1908, outstanding liabilities	2,745.80
July 1, 1908, balance available	70,346.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	45,000.00

APPROPRIATIONS.

OLD CHANNEL.

June 23, 1866	$20,000.00	March 3, 1879	$20,000.00
March 2, 1867	20,000.00	June 14, 1880	30,000.00
April 10, 1869	29,700.00	March 3, 1881	40,000.00
July 11, 1870	50,000.00	August 2, 1882	50,000.00
March 3, 1871	50,000.00	July 5, 1884	20,000.00
June 10, 1872	15,000.00	August 5, 1886 (see note)	9,632.61
March 3, 1873	100,000.00	August 11, 1888	5,000.00
June 23, 1874	75,000.00	September 19, 1890	5,000.00
March 3, 1875	75,000.00		
August 14, 1876	60,000.00	Total for old channel	724,332.61
March 18, 1878	50,000.00		

STRAIGHT CHANNEL.

July 5, 1884	$25,000.00	June 28, 1902	$223,000.00
Deduct amount appropriated for old channel (see note)	9,632.61	March 3, 1903	190,000.00
		April 28, 1904	70,000.00
	15,367.39	March 3, 1905	20,000.00
August 5, 1886	112,500.00	March 3, 1905	161,000.00
August 11 1888	150,000.00	Proceeds of sale of Government property	2,110.00
September 19, 1890	200,000.00		
July 13, 1892	200,000.00	Total for straight channel	1,869,477.39
August 18, 1894	70,000.00		
June 3, 1896	150,000.00	Total of all appropriations for Toledo Harbor, Ohio	2,593,810.00
March 3, 1899	150,000.00	Expended to June 30, 1908	2,520,718.20
June 6, 1900	132,500.00		
March 3, 1901	8,000.00		73,091.80
June 13, 1902	15,000.00		

NOTE.—By act of August 5, 1886, the balance then available of the $25,000 appropriated July 5, 1884, for straight channel was made available for clearing the old channel.

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COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Toledo, Ohio, were compiled from information furnished by the collector of customs and the Bureau of Statistics, Department of Commerce and Labor:

Receipts.	Tons.	Shipments.	Tons.
Iron: Ore	1,458,343	Iron, manufactures	114
Pig	7,476	Coal:	
Coal, hard	8,714	Hard	16,095
Salt	28,492	Soft	3,229,702
Lumber	35,115	Bunker	134,594
Wheat	7,088	Salt	308
Flax	36,660	Lumber	412
Stone, lime, and sand	6,683	Wheat	24,602
Fish	575	Flour	1,422
Miscellaneous	54,970	Corn	2,676
		Stone, lime, and sand	5,310
		Crude oil	10,899
		Miscellaneous	9,335
Total	1,644,116	Total	3,433,759

Total freight tonnage:

1907	5,077,875
1906	4,522,280
Increase	555,595

Vessels.	Number.	Tonnage.
Entering	1,602	2,482,071
Departing	1,647	2,528,540

Total registered tonnage (vessels entering and departing):

1907	5,010,611
1906	3,292,459
Increase	1,718,152

P P 2.

IMPROVEMENT OF PORT CLINTON HARBOR, OHIO.

The location and early history of this work are given upon pages 2647 and 2648, Report of Chief of Engineers, 1898.

The funds available at the beginning of the present fiscal year amounted to $3,000.

Under a contract dated June 29, 1907, with the Buckeye Contracting Company, of Cleveland, Ohio, for stone reinforcement and repair of jetties, work was begun January 1, 1908, and was completed March 21, 1908.

The following statement shows the amount and cost of the materials used:

1,396.55 tons heavy riprap stone, at $1.85	$2,583.62
203.55 tons small riprap stone, at $1.65	335.86
Total	2,919.48

Use made of the land owned by the United States, upon which the Government storehouse and ways for repair of Government vessels has been established, for making the necessary winter repairs to the

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U. S. dredge *Maumee*, tug *Spear*, and one derrick scow. Two 500-yard dump scows, work on which was begun during the previous fiscal year in the Port Clinton yard, were completed in October and November, 1907, respectively.

Money statement.

July 1, 1907, balance unexpended	$3,000.00
June 30, 1908, amount expended during fiscal year for maintenance of improvement	2,999.29
July 1, 1908, balance unexpended	.71
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	2,500.00

APPROPRIATIONS.

July 10, 1872	$8,000.00	July 13, 1892	$10,000.00
July 10, 1872 (allotment)	2,000.00	August 18, 1894	6,000.00
March 3, 1875	5,000.00	June 3, 1896	6,000.00
August 14, 1876	5,000.00	March 3, 1899	6,000.00
June 18, 1878	10,000.00	June 13, 1902	5,000.00
March 3, 1879	10,000.00	March 3, 1905	2,000.00
June 14, 1880	5,000.00	March 2, 1907	3,000.00
March 3, 1881	5,000.00		
August 2, 1882	6,000.00	Total	104,000.00
August 5, 1886	2,000.00	Expended to June 30, 1908	103,999.29
August 11, 1888	5,000.00		
September 19, 1890	3,000.00		.71

NOTE.—The river and harbor act of July 13, 1892, provided "that of the amount, $1,200 are to be paid to Charles Roose, of Oak Harbor, Ohio, in full satisfaction for the necessary portion of the sand beach adjoining the inner end of the west revetment of Port Clinton Harbor."

CONTRACT IN FORCE.

CONTRACT FOR STONE REINFORCEMENT AND REPAIR OF JETTIES AT PORT CLINTON HARBOR, OHIO.

Name of contractor: The Buckeye Contracting Company, Cleveland, Ohio.
Date of contract: June 29, 1907.
Date of approval: July 18, 1907.
Date of commencement: January 6, 1908.
Date of completion: March 21, 1908.

COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Port Clinton, Ohio, were compiled from information furnished by the collector of customs and the Bureau of Statistics, Department of Commerce and Labor:

Receipts.	Tons.	Shipments.	Tons.
Lumber	5,809	Coal:	
Fish	3,800	Soft	39
Miscellaneous	580	Bunker	4
		Lumber	13
		Miscellaneous	14
Total	10,189	Total	6

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Total freight tonnage:

1907	10,851
1906	11,930
Decrease	1,079

Vessels.	Number.	Tonnage.
Entering	24	4,113
Departing	27	3,196

Total registered tonnage (vessels entering and departing):

1907	7,309
1906	16,135
Decrease	8,826

P P 3.

IMPROVEMENT OF SANDUSKY HARBOR, OHIO.

A description of location and various projects of improvement, with results obtained, is given upon page 2650, Report of Chief of Engineers, 1898.

Under a contract dated June 14, 1905, with the Great Lakes Dredge and Dock Company, of Chicago, Ill., for dredging in the straight channel and the east and west dock channels, work was completed on October 1, 1907.

The following table shows in detail the quantities and cost of work done under this completed contract:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Straight channel.					
Dredging.....cubic yards..	$0.104	23,839	$2,479.25	1,035,056	$107,645.82
Logging.....hours..				1.25	45.65
East dock channel.					
Dredging.....cubic yards..	.129	29,427	3,796.07	366,309	47,253.86
Logging.....hours..				19.55	604.54
West dock channel.					
Dredging.....cubic yards..	.149	223,910	33,362.59	563,502	83,961.80
Logging.....hours..		91.55	2,609.30	192.30	5,251.67
Board of inspectors.					
Per day per man.....	.60	731	438.60	3,133½	1,880.10
Total.....			42,685.81		246,643.44

The work of deepening and widening the channel is being carried on in this harbor under contract dated July 15, 1907, with the Great Lakes Dredge and Dock Company, of Chicago, Ill., for removal of bed rock and overlying materials in the east and west dock channels.

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The following table shows in detail the quantities and cost of work done under this contract during the fiscal year 1908, and the totals to date:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
West dock channel.					
Bed rock drilled and blasted or otherwise broken up.....cubic yards..	$2.50	3,081.8	$7,704.50	3,081.8	$7,704.50
Bed rock and overlying material removed .....cubic yards..	.65	13,117.0	8,526.05	13,117.0	8,526.05
East dock channel.					
Bed rock drilled and blasted or otherwise broken up.....cubic yards..	2.50	5,580.2	13,950.50	5,580.2	13,950.50
Bed rock and overlying material removed .....cubic yards..	.65	964.0	626.60	964.0	626.60
Board of inspectors.					
Per day per man.....	.75	522	391.50	522	391.50
Total.....			31,199.15		31,199.15

This work is 36.1 per cent completed.

The U. S. dredge *Maumee* worked from July 1 to August 19, 1907, shipping bed rock and casting over stone on the prolongation of the east jetty. This work was done at a cost of $4,073.65.

The appropriation recommended will be applied to rock removal in the inner harbor, dredging, and jetty construction in outer channel as necessary to complete existing project and is for extension of benefits of the improvement.

Money statement.

July 1, 1907, balance unexpended.....	$381,764.86
June 30, 1908, amount expended during fiscal year for works of improvement.....	100,348.03
July 1, 1908, balance unexpended.....	281,416.83
July 1, 1908, outstanding liabilities.....	3,882.10
July 1, 1908, balance available.....	277,534.73
July 1, 1908, amount covered by uncompleted contracts.....	59,020.70
Amount (estimated) required for completion of existing project.....	135,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended Juy 1, 1908.....	135,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

May 20, 1826 (survey).....	$400.00	March 3, 1875.....	$25,000.00
June 11, 1844.....	15,000.00	August 14, 1876.....	25,000.00
August 30, 1852.....	15,000.00	June 18, 1878.....	20,000.00
June 28, 1864 (allotment)..	10,000.00	March 3, 1879.....	1,000.00
June 23, 1866.....	38,580.00	July 14, 1880.....	12,500.00
June 11, 1870.....	10,000.00	March 3, 1881.....	10,000.00
June 10, 1872.....	13,000.00	August 2, 1882.....	10,000.00
March 3, 1873.....	25,000.00	July 5, 1884.....	20,000.00
June 23, 1874.....	25,000.00	August 5, 1886.....	5,000.00

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APPROPRIATIONS—continued.

August 11, 1888	$40,000.00	June 30, 1906	$175,000.00
September 19, 1890	45,000.00	March 2, 1907	125,000.00
July 13, 1892	41,712.00	March 4, 1907	175,000.00
August 18, 1894	30,000.00		
June 3, 1896	40,000.00	Total	1,292,192.00
March 3, 1899	80,000.00	Expended to June 30, 1908	1,010,775.17
June 13, 1902	125,000.00		
April 28, 1904 (allotment)	10,000.00		281,416.83
March 3, 1905	125,000.00		

CONTRACTS IN FORCE.

CONTRACTS FOR DREDGING AT SANDUSKY HARBOR, OHIO.

Name of contractor: The Great Lakes Dredge and Dock Company, Chicago, Ill.
Date of contract: June 14, 1905.
Date of approval: July 8, 1905.
Date of commencement: June 20, 1905.
Date of completion: October 1, 1907.

Name of contractor: The Great Lakes Dredge and Dock Company, Chicago, Ill.
Date of contract: July 15, 1907.
Date of approval: July 26, 1907.
Date of commencement: August 19, 1907.
Date of completion: January 29, 1908.
Extended for a reasonable period.

COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Sandusky, Ohio, were compiled from information furnished by the collector of customs and the Bureau of Statistics, Department of Commerce and Labor:

Receipts.	Tons.	Shipments.	Tons.
Iron ore	83,043	Coal:	
Salt	6,190	Hard	5,955
Lumber	43,485	Soft	1,011,363
Grain	11,143	Bunker	471,000
Fish	4,206	Lumber	52
Stone, lime, and sand	244,344	Stone, lime, and sand	298,400
Miscellaneous	28,980	Miscellaneous	31,700
Total	421,391	Total	1,818,470

Total freight tonnage:

1907	2,239,861
1906	1,366,663
Increase	873,198

Vessels.	Number.	Tonnage.
Entering	7,336	1,420,205
Departing	7,325	1,405,000

Total registered tonnage (vessels entering and departing):

1907	2,825,205
1906	2,600,529
Increase	224,676

One new vessel line established during the year.

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PP 4.

IMPROVEMENT OF HURON HARBOR, OHIO.

A description of the early conditions of the harbor at the mouth of Huron River and of the projects for its improvement is given on pages 2653 and 2654, Report of Chief of Engineers, 1898.

The present project is given in full in the Report of Chief of Engineers, 1904, pages 3209 to 3218, inclusive.

At the close of the last fiscal year work was in progress, and 48 per cent completed, under a contract with the Hunkin Brothers Construction Company, of Cleveland, Ohio, dated April 23, 1906, for constructing concrete superstructure on two new pierheads, 240 linear feet of new jetty and 342 linear feet of old jetty; for constructing 1,800 linear feet of rubble mound jetty; and for sheathing 342 linear feet of old jetty.

Work under this contract was completed May 19, 1908.

The following statement shows the amount and cost of work done under this contract for the fiscal year 1908, and totals to date:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
New superstructure.					
Old superstructure prepared for new..linear feet..	$10.00	287	$2,870.00	343	$3,430.00
Concrete blocks.....cubic yards..	10.00	367.95	3,679.50	1,165.9	11,659.00
Concrete in mass.....do....	8.00	1,303.9	10,431.20	3,323.6	26,588.80
Small riprap stone.....tons..	1.00	563	583.00	2,434.61	2,434.61
Paving for pierheads.....square feet..	.70	1,122	785.40	1,122	785.40
Oak fenders above water.....M feet..	60.00	5,882	352.92	9,169	880.14
Mooring rings.....pounds..	.10	184	18.40	468	46.80
Sleeve bolts and washers.....do....	.05	3,821	191.05	5,645	282.25
Tie-rods and washers.....do....	.10	3,430	343.00	3,430	343.00
Total.....			19,254.47		46,122.00
Rubble mound jetty.					
Fascine mattress.....square feet..	30.00			162.87	4,886.10
Small riprap stone.....tons..	1.30	3,824.28	4,581.56	8,124.11	10,561.34
Quarry run stone.....do....	1.30	24,881.02	32,345.33	44,140.45	57,382.60
Large placed stone.....do....	1.70	17,081.40	29,038.38	23,328.82	39,658.99
Total.....			65,965.27		112,488.03
Sheathing.					
Oak fender below water.....M feet..	100.00	1,715	171.50	2,033	203.30
Hardwood sheathing plank.....do....	100.00	22,669	2,266.90	22,882	2,288.20
Lag screws and washers.....pounds..	.06	8,209	492.54	8,295	497.70
Screw bolts and washers.....do....	.10	514	51.40	608	60.80
Total.....			2,982.34		3,050.00
Grand total.....			88,202.08		161,661.03

May 11, 1908, the U. S. dredge *Maumee* began work removing the old East pier and dredging the sheltered area in accordance with the approved project. To date the old East pier has been removed to a point about 200 feet north of the shore line, as far as is at present intended, and a total of 26,783 cubic yards of material

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have been excavated from the basin an thed old pier at a cost of $3,384.85, or about 12½ cents per cubic yard.

Money statement.

July 1, 1907, balance unexpended	$175,864.12
Receipts from sales	.74
	175,864.86
June 30, 1908, amount expended during fiscal year, for works of improvement	118,549.77
July 1, 1908, balance unexpended	57,315.09
July 1, 1908, outstanding liabilities	1,876.91
July 1, 1908, balance available	55,438.18

APPROPRIATIONS.

May 20, 1826	$5,000.00	August 5, 1886	$3,000.00
May 19, 1828	4,413.35	August 11, 1888	6,000.00
March 3, 1829	5,935.00	September 19, 1890	16,000.00
April 23, 1830	1,880.36	July 13, 1892	15,000.00
March 2, 1831	3,480.00	August 18, 1894	10,000.00
July 3, 1832	1,500.00	June 3, 1896	8,000.00
June 28, 1834	6,700.00	March 3, 1899	25,000.00
June 2, 1836	4,300.00	June 13, 1902	40,000.00
March 3, 1837	2,565.00	April 28, 1904 (allotment)	40,000.00
July 7, 1838	5,000.00	March 3, 1905	68,500.00
June 11, 1844	5,000.00	Proceeds of sale of Government property	26.67
August 30, 1852	10,000.00	June 30, 1906	150,000.00
June 23, 1866	39,000.00	March 2, 1907	16,000.00
June 23, 1874	1,500.00	March 4, 1907	47,000.00
March 3, 1875	1,000.00		
June 18, 1878	1,000.00	Total	558,800.38
June 14, 1880	3,000.00	Expended to June 30, 1908	501,485.29
March 3, 1881	3,000.00		
August 2, 1882	2,500.00		57,315.09
July 5, 1884	7,500.00		

CONTRACT IN FORCE.

CONTRACT FOR CONSTRUCTING CONCRETE SUPERSTRUCTURE ON TWO NEW PIERHEADS, 240 FEET OF NEW JETTY AND 342 LINEAR FEET OF OLD JETTY; FOR CONSTRUCTING 1,800 LINEAR FEET OF RUBBLE MOUND JETTY; FOR SHEATHING 342 LINEAR FEET OF OLD JETTY.

Name of contractor: The Hunkin Brothers Construction Company, Cleveland, Ohio.
Date of contract: April 23, 1906.
Date of approval: May 8, 1906.
Date of commencement: August 13, 1906.
Date of completion: May 19, 1908.

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COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Huron, Ohio, were compiled from information furnished by the Bureau of Statistics, Department of Commerce and Labor:

Receipts.	Tons.	Shipments.	Tons.
Iron ore	1,062,128	Coal:	
Lumber	177	Soft	1,196,919
Fish	200	Hard	10,519
Miscellaneous	873	Bunker	50,598
		Iron, manufactures	58
		Miscellaneous	1
Total	1,063,378	Total	1,258,077

Total freight tonnage:	
1907	2,321,455
1906	1,675,096
Increase	646,359

Vessels.	Number.	Tonnage.
Entering	549	1,094,733
Departing	557	1,093,187

Total registered tonnage (vessels entering and departing):	
1907	2,187,939
1906	1,482,373
Increase	705,566

P P 5.

IMPROVEMENT OF VERMILION HARBOR, OHIO.

For a description and history of this improvement see page 2696, Report of Chief of Engineers, 1898.

Under a contract dated June 29, 1907, with the Buckeye Contracting Company, of Cleveland, Ohio, for reenforcing and repairing jetties, work was commenced August 21, 1907, and finished December 20, 1907.

The following statement shows the amount and cost of the work:

616.5 linear feet of old superstructure prepared, at $3 per linear foot	$1,849.50
2,494.13 tons paving stone, at $2.80 per ton	6,983.56
2,783.33 tons heavy riprap stone, at $1.80 per ton	5,009.99
Total	13,843.05

Money statement.

July 1, 1907, balance unexpended	$15,124.44
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	14,968.62
July 1, 1908, balance unexpended	155.82
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	500.00

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APPROPRIATIONS.

July 2, 1836	$10,000.00	August 11, 1888	$1,000.00
March 3, 1837	20,000.00	September 19, 1890	2,000.00
July 7, 1838	23,626.57	July 13, 1892	2,000.00
June 28, 1864 (allotment)	5,758.97	June 3, 1896	2,000.00
June 23, 1866	15,315.74	August 18, 1894	2,000.00
June 10, 1872	5,000.00	June 6, 1900 (allotment)	176.27
March 3, 1873	12,000.00	August 5, 1902 (allotment)	400.00
June 23, 1874	3,000.00	March 3, 1905	15,000.00
March 3, 1875	10,000.00	March 2, 1907	15,000.00
August 14, 1876	5,000.00		
June 18, 1878	4,000.00	Total	163,277.55
June 14, 1880	2,000.00	Expended to June 30, 1908	163,121.73
March 3, 1881	2,000.00		
August 2, 1882	3,000.00		155.82
August 5, 1886	3,000.00		

CONTRACT IN FORCE.

CONTRACT FOR STONE REENFORCEMENT AND REPAIR OF JETTIES.

Name of contractor: The Buckeye Contracting Company, Cleveland, Ohio.
Date of contract: June 29, 1907.
Date of approval: July 18, 1907.
Date of commencement: August 19, 1907.
Date of completion: December 20, 1907.

COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Vermilion, Ohio, were compiled from information furnished by the Bureau of Statistics, Department of Commerce and Labor:

Receipts.	Tons.	Shipments.	Tons.
Lumber	225	Ice	150
Fish	784	Lumber	450
Total	1,009	Total	600

Total freight tonnage:

1907	1,609
1906	1,025
Increase	584

Vessels.	Number.	Tonnage.
Entering	43	1,385
Departing	45	939

Total registered tonnage (vessels entering and departing):

1907	2,324
1906	1,076
Increase	1,248

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PP 6.

IMPROVEMENT OF LORAIN HARBOR, OHIO.

A description of the location, conditions, and projects for improvement of this harbor is given on pages 2658 and 2718 to 2728, Report of Chief of Engineers, 1898.

Work is being done at this harbor under a contract with Patrick Keohane, of Fayetteville, N. Y., dated October 27, 1900, for constructing west breakwater, two pierheads, and removing and rebuilding parts of the east and west piers; and also a second contract with this same party, dated August 3, 1904, for constructing the east breakwater.

Under contract dated October 27, 1900, for constructing west breakwater, two pierheads, and removing and rebuilding parts of the east and west piers; the west breakwater was completed as modified by supplementary agreement dated April 12, 1907; the west pierhead was completed and the work of placing the concrete superstructure on the east pierhead was commenced; the work of removing and rebuilding parts of the east and west piers was completed prior to the beginning of the present fiscal year.

At the present time the contract is 95 per cent completed.

The work accomplished under contract dated October 27, 1900, for constructing west breakwater, two pierheads, and removing and rebuilding parts of east and west piers, is shown in the following table:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
West breakwater.					
Paving.....tons..	$1.87	.....	.....	.....	.....
Small riprap stone.....do....	.89	.....	.....	617.7	$549.75
Heavy riprap stone.....do....	.90	.....	.....	43,218.7	38,896.83
Core filling.....do....	.70	.....	.....	74,265.6	51,985.92
Quarry run stone.....do....	1.12	45,942.6	$51,455.71	58,779.2	65,832.70
Total.....	.....	.....	51,455.71	.....	157,265.20
East and west pier reconstruction and pierheads.					
Dredging.....cubic yard..	.19	.....	.....	125,162.69	23,780.78
Old pier removed.....linear feet..	4.10	.....	.....	1,943.00	7,966.30
Hemlock timber.....M feet..	22.00	.....	.....	2,611,093.00	57,444.05
Oak timber.....do....	38.00	.....	.....	240,160.00	9,126.08
Bolts, tie-rods, etc.....pound..	.035	.....	.....	554,840.00	19,419.40
Lag screws and spikes.....do....	.04	.....	.....	255,788.00	10,231.52
Straps.....do....	.05	.....	.....	2,113.00	105.65
Concrete blocks.....cubic feet..	.37	5,147.57	1,904.60	80,046.25	29,617.11
Concrete in mass.....cubic yard..	7.30	316.1	2,307.53	6,794.89	49,602.70
Filling stone and pierhead foundations, tons.....	.89	652.65	580.86	33,762.05	30,048.22
Foundation stone for piers.....tons..	.89	.....	.....	3,261.8	2,903.00
Heavy riprap for pierhead foundation, tons.....	.90	.....	.....	3,699.9	3,329.91
Paving for well.....tons..	2.25	.....	.....	.....	.....
Total.....	.....	.....	4,792.99	.....	243,574.72
Grand total.....	.....	.....	56,248.70	.....	400,839.92

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Under contract dated August 3, 1904, for the construction of east breakwater, work has advanced until section of 1,300 feet has been completed. The remainder, 200 feet, has been completed to an elevation of −8 feet.

This contract is 85 per cent completed.

The work accomplished under this contract dated August 3, 1904, for constructing the east breakwater is shown in the following table:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Core filling.....cubic yards..	$0.70	.....	.....	18,646.7	$13,052.69
Quarry-run stone.....tons..	1.10	4,196.5	$4,616.15	49,916.9	54,908.59
Large placed stone.....do....	1.43	4,207.95	6,017.37	33,418.85	47,788.96
Total.....	.....	.....	10,633.52	.....	115,750.24

The work of reconstructing parts of the west pier, being carried on under contract with the Buckeye Contracting Company, of Cleveland, Ohio, dated July 3, 1905, was completed January 31, 1908.

At the close of the last fiscal year the work was 67½ per cent complete. The remainder of the work was done during the early part of the present fiscal year.

The quantities and cost of materials used for this work are shown in the following table:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Preparing old superstructure....linear feet..	$9.75	77.5	$755.63	638.5	$6,225.38
Concrete blocks.....cubic yards..	10.50	80.68	847.14	714.8	7,505.40
Concrete in mass.....do....	7.40	732.4	5,419.76	2,335.52	17,282.85
Hard-wood sheathing.....M feet..	123.00	11,641.0	1,431.84	38,344.0	4,716.31
Oak timber.....do....	89.00	5,916.0	526.52	12,097.0	1,076.63
Lag screws and washers.....pound..	.05	3,363.0	168.15	12,189.0	609.45
Screw bolts and washers.....do....	.05	129.6	6.48	1,056.4	52.82
Sleeve bolts and washers.....do....	.05	3,749.0	187.45	5,726.0	286.30
Tie-rods and washers.....do....	.06	480.0	28.80	2,040.0	122.40
Small riprap stone.....tons..	1.05	146.87	154.21	1,171.48	1,230.05
Broken stone.....do....	1.45	14.37	20.84	99.43	144.17
Total.....	.....	.....	9,546.82	.....	39,251.76

Money statement.

July 1, 1907, balance unexpended.....		$262,412.75
June 30, 1908, amount expended during fiscal year:		
For works of improvement.....	$98,795.39	
For maintenance of improvement.....	9,496.52	
		108,291.91
July 1, 1908, balance unexpended.....		154,120.84
July 1, 1908, outstanding liabilities.....		5,207.56
July 1, 1908, balance available.....		148,913.28
July 1, 1908, amount covered by uncompleted contracts.....		19,238.09

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APPROPRIATIONS.

May 23, 1828	$7,500.00	August 5, 1886	$10,000.00
April 23, 1830	8,559.77	August 11, 1888	10,000.00
May 2, 1831	9,275.00	September 19, 1890	12,000.00
July 3, 1832	8,000.00	July 13, 1892	20,000.00
March 2, 1833	2,400.00	August 18, 1894	10,000.00
June 28, 1834	5,000.00	June 3, 1896	30,000.00
March 3, 1835	4,400.00	March 3, 1899	50,000.00
July 2, 1836	6,660.00	June 6, 1900	125,000.00
March 3, 1837	6,410.00	June 13, 1902	6,000.00
July 7, 1838	5,000.00	June 23, 1902	300,000.00
August 30, 1852	5,000.00	March 3, 1903	9,000.00
June 28, 1864 (allotment)	20,000.00	April 28, 1904	100,000.00
June 23, 1866	10,000.00	March 3, 1905 (2)	105,000.00
June 10, 1872	20,000.00	June 30, 1906	46,000.00
March 3, 1873	20,000.00	Received from other sources	79.60
June 23, 1874	20,000.00	March 2, 1907	30,000.00
March 3, 1875	10,000.00	Total	1,063,284.37
August 14, 1876	6,000.00	Expended to June 30, 1908	909,163.53
June 18, 1878	1,000.00		154,120.84
June 14, 1880	1,000.00		
March 3, 1881	7,000.00		
August 2, 1882	7,000.00		
July 5, 1884	10,000.00		

CONTRACTS IN FORCE.

CONTRACT FOR CONSTRUCTING WEST BREAKWATER, TWO PIERHEADS, REMOVING AND REBUILDING PARTS OF EAST AND WEST PIERS.

Name of contractor: Patrick Keohane, Fayetteville, N. Y.
Date of contract: October 27, 1900.
Date of approval: November 22, 1900.
Date of commencement: April 1, 1901.
Date of completion: August 31, 1905.
Extended for a reasonable period.

CONTRACT FOR CONSTRUCTING THE EAST BREAKWATER.

Name of contractor: Patrick Keohane, Fayetteville, N. Y.
Date of contract: August 3, 1904.
Date of approval: September 16, 1904.
Date of commencement: October 10, 1904.
Date of completion: December 31, 1906.
Extended for a reasonable period.

CONTRACT FOR RECONSTRUCTING AND REPAIRING PARTS OF WEST PIER.

Name of contractor: The Buckeye Contracting Company, Cleveland, Ohio.
Date of contract: July 3, 1905.
Date of approval: July 21, 1905.
Date of commencement: August 14, 1905.
Date of completion: January 31, 1908.

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COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Lorain, Ohio, were compiled from information furnished by the collector of customs and the Bureau of Statistics, Department of Commerce and Labor:

Receipts.	Tons.	Shipments.	Tons.
Iron ore	2,921,660	Coal, hard	13,000
Lumber	9,223	Coal, soft	2,052,477
Stone, sand, and lime	57,002	Coal, bunker	112,496
Fish	500	Lumber	150
Ice	116	Miscellaneous	323
Miscellaneous	68,473		
Total	3,051,974	Total	2,178,446

Total freight tonnage:

1907	5,230,420
1906	4,325,691
Increase	904,729

Vessels.	Number.	Tonnage.
Entering	903	2,220,228
Departing	835	2,192,998
Built	10	59,980

Total registered tonnage (vessels entering and departing):

1907	4,413,226
1906	3,596,316
Increase	816,910

P P 7.

IMPROVEMENT OF CLEVELAND HARBOR, OHIO.

For a history of the early conditions and projects of improvements, see pages 2661–2662, Report of the Chief of Engineers for 1898, and pages 530 and 531, Report of the Chief of Engineers for 1899.

The work of improvement of the main entrance of Cleveland Harbor, Ohio, is being done under a continuous contract with the L. P. & J. A. Smith Company, of Cleveland, Ohio, dated November 19, 1902.

This work is now 87½ per cent completed. The two pierheads at the new entrance are entirely finished; the west breakwater is complete; the east breakwater is finished for 370 feet and built up to mean lake level over the remaining length. The west protection is finished for 875 feet and built up to mean lake level for the remaining 125 feet. The east protection is built up to mean lake level for its entire length, 50 feet being completed.

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The following is a tabular statement of work done under this contract:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Two pierheads (complete)					$70,077.64
Two rubble mound breakwaters.					
Large riprap stone, tons	$1.50			69,231.4	103,847.10
Small riprap stone, do	1.30			28,378.2	36,892.26
Quarry-run stone, do	1.45	105,287.8	$152,667.30	129,741.4	188,125.03
Paving stone, first-class, do	3.00			880.0	2,640.00
Paving stone, second-class, do	2.90			630.0	1,827.00
Gravel core filling, cubic yards	.70			46,102.2	32,271.54
Sand core filling, do	.40			44,384.8	17,753.92
Total			152,667.30		383,357.55
Riprap protection for present breakwaters.					
Large riprap stone, tons	1.50			27,338.5	41,007.75
Small riprap stone, do	1.30			10,367.0	13,477.10
Quarry-run stone, do	1.45	38,333.2	55,583.14	38,870.4	56,362.08
Paving stone, second-class, do	2.90			781.0	2,264.90
Gravel core filling, cubic yards	.70			8,491.8	5,944.26
Sand core filling, do	.40			512.0	204.80
Total			55,583.14		119,260.89
Grand total			208,250.44		572,698.08

The work for the improvement and enlargement of Cleveland Harbor, by extending the main breakwater eastward, is being done under contracts dated November 20, 1902, for the Eastern and Western divisions.

The following is a tabular statement of the work done under these contracts:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Pierhead.					
Hemlock timber, M feet	$28.00			177,368.0	$4,966.30
Oak timber, do	50.00			1,440.0	72.00
Beech timber, do	45.00			16,320.0	734.40
Large riprap stone, tons	1.30			1,185.0	1,540.50
Small riprap stone, do	1.14			5,247.0	5,981.58
Small paving stone, do	4.00			191.7	766.80
Bolts, tie-rods, etc, pounds	.04			38,735.0	1,549.40
Concrete blocks, cubic yards	11.00			226.6	2,492.60
Concrete in mass, do	8.00			466.0	3,728.00
Wrought-iron pipe, pounds	.50			271.0	135.50
Total					21,967.38
Rubble Mound Breakwater—Western Division.					
Heavy riprap stone, tons	1.35			746.5	1,007.78
Large riprap stone, do	1.30			191,902.4	249,473.12
Small riprap stone, do	1.14			58,802.0	67,034.28
Quarry-run stone, do	1.083			103,463.5	112,050.97
Do, do	1.30	61,229.3	$79,598.09	107,683.8	139,988.94
Paving stone, first-class, do	2.75			31,981.6	87,949.40
Paving stone, second-class, do	2.70			12,917.2	34,876.44
Core filling, shale, cubic yards	.70			153,142.5	107,199.75
Core filling, sand, do	.40			140,779.3	56,311.72
Total			79,598.09		855,892.40
Rubble Mound Breakwater—Eastern Division.					
Large riprap stone, tons	1.30			122,628.1	159,416.53
Small riprap stone, do	1.14			55,564.9	63,343.99
Quarry-run stone, do	1.083			7,965.9	8,627.67
Do, do	1.30	154,926.0	201,403.80	164,363.1	213,672.03
Core filling, shale, cubic yards	.70			106,721.2	74,704.84
Core filling, sand, do	.40			98,964.4	39,585.76
Total			201,403.80		559,350.22
Grand total			281,001.89		1,937,210.50

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The Western Division is about 97 per cent, the Eastern Division about 62 per cent, and the whole work 73½ per cent completed.

During the storm which occurred on Lake Erie, October 26, 1906, a considerable settling was observed in the completed portion of the new rubble mound east breakwater. The principal settlement occurred in the first two 1,000-foot sections, where sand had been used in large quantities as a core filling. A board of engineer officers appointed to consider this matter approved, by report dated March 23, 1907, of the modification in the cross section suggested by the district officer, which was to abandon the use of sand and shale as a core filling and to complete the structure entirely of quarry-run stone containing not more than 25 per cent of stones weighing less than 1 ton, and using an outside covering 5 feet thick composed of stones weighing not less than 3 tons each, set with their greatest dimensions into the work.

At the time the change was made about 2,000 feet of the breakwater had been completed in accordance with the original plans and 1,000 feet additional was nearly completed.

The condition of the work is approximately as follows:

The first, second, third, and fourth 1,000-foot sections are complete; the core has been built up to within about 1 foot of the water surface in the fifth, sixth, seventh, eighth, ninth, and tenth 1,000-foot sections; covering stone has been placed on both lake and harbor sides up to −5 feet in the fifth section and a small portion of the sixth.

The improvement of Cleveland Harbor by dredging is being carried on under a contract with the Great Lakes Dredge and Dock Company, dated July 15, 1907. This work consists of dredging to a depth of 25 feet the north half of the west basin, the channel between the main entrance and the Lake Shore Railway bridge, and so much of the east basin as the funds available will permit.

The following statement shows the total work done under this contract:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Dredging.....cubic yards..	$0.1395	55,294.9	$7,713.64	55,294.9	$7,713.64
Logging.....hour..	.....	2¾	78.55	2¾	78.55
Board of inspectors.....per day..	.75	609	456.75	609	456.75
Total.....	.....	.....	8,248.94	.....	8,248.94

Work under a contract with the L. P. & J. A. Smith Company, dated June 28, 1905, for improving Cleveland Harbor by dredging was completed July 20, 1907.

The following statement shows the total work done under this contract:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Dredging.....cubic yards..	$0.11½	33,185	$3,816.28	1,270,585	$146,117.28
Logging.....hour..	.....	¾	18.81	7	144.70
Board of inspectors.....per day..	.75	20½	15.25	552½	414.25
Total.....	.....	.....	3,850.34	.....	146,676.23

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Money statements.

UNDER CONTRACTS, ETC., AUTHORIZED BY ACT OF JUNE 3, 1896.

July 1, 1907, balance unexpended	$49,293.44
Receipts from sales	14.27
Collections on account of damages to pier	50.00
	49,357.71
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,872.87
July 1, 1908, balance unexpended	45,484.84

MAINTENANCE (DREDGING) AND CONTINUING IMPROVEMENT.

July 1, 1907, balance unexpended	$206,672.59
June 30, 1908, amount expended during fiscal year for maintenance of improvement	101,881.42
July 1, 1908, balance unexpended	104,791.17
July 1, 1908, outstanding liabilities	4,014.59
July 1, 1908, balance available	100,776.58
July 1, 1908, amount covered by uncompleted contracts	41,695.48

WHARF ROOM.

July 1, 1907, balance unexpended	$98,000.00
July 1, 1908, balance unexpended	98,000.00

NEW ENTRANCE, BREAKWATER EXTENSION, ETC., ACTS OF JUNE 13, 1902, AND MARCH 2, 1907.

July 1, 1907, balance unexpended		$696,325.53
Amount appropriated by sundry civil act approved May 27, 1908		475,000.00
		1,171,325.53
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$499,266.16	
For Isthmian Canal Commission	[a] 18.38	
		499,284.54
July 1, 1908, balance unexpended		672,040.99
July 1, 1908, outstanding liabilities		94,128.56
July 1, 1908, balance available		577,912.43
July 1, 1908, amount covered by uncompleted contracts		420,681.24
Amount (estimated) required for completion of existing project		1,818,956.00

Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908 ..... 775,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897.

[a] To be refunded.

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APPROPRIATIONS.

March 3, 1825	$5,000.00	August 2, 1882	$175,000.00
March 2, 1827	10,000.00	July 3, 1884	100,000.00
March 29, 1829	12,179.00	August 5, 1886	93,750.00
April 23, 1830	1,786.56	August 11, 1888	100,000.00
March 2, 1831	3,670.00	September 19, 1890	75,000.00
July 3, 1832	6,600.00	July 13, 1892	100,000.00
June 28, 1834	13,315.00	August 18, 1894	50,000.00
July 2, 1836	15,006.59	June 3, 1896	80,000.00
March 3, 1837	10,000.00	June 4, 1897	350,000.00
July 7, 1838	51,856.00	July 1, 1898	294,000.00
June 11, 1844	25,000.00	March 3, 1899	175,000.00
August 30, 1852	30,000.00	June 6, 1900	175,000.00
March 3, 1853	145.69	June 13, 1902	625,000.00
June 28, 1864 (allotment)	20,000.00	June 28, 1902	107,000.00
June 23, 1866	59,806.00	March 3, 1903	227,500.00
June 25, 1868 (allotment)	17,000.00	April 28, 1904	485,200.00
April 10, 1869 (allotment)	13,380.00	February 4, 1903 (unexpended balance of allotment of $6,000 for repair of levee of Muskingum River, for improving harbor at Cleveland, Ohio)	56.52
July 11, 1870	20,000.00	March 3, 1905	830,800.00
March 3, 1871 (allotment for repairs)	636.77	June 30, 1906	350,000.00
March 3, 1873	1,000.00	Received from other sources	615.41
June 24, 1874	30,500.00	March 2, 1907	223,000.00
Total previous to adoption of project for harbor of refuge	346,881.61	March 4, 1907	200,000.00
March 3, 1875	50,000.00	May 27, 1908	475,000.00
August 14, 1876 (repair of pier)	8,000.00	Total	6,271,803.54
August 14, 1876	50,000.00	Expended to June 30, 1908	5,351,486.54
June 18, 1878	100,000.00		920,317.00
March 3, 1879	100,000.00		
June 14, 1880	125,000.00		
March 3, 1881	200,000.00		

CONTRACTS IN FORCE.

CONTRACTS FOR IMPROVEMENT AND ENLARGEMENT OF CLEVELAND HARBOR, OHIO.

Name of contractor: Hughes Brothers & Bangs, Syracuse, N. Y.
Date of contracts: November 20, 1902.
Date of approval: December 30, 1902.
Date of commencement: May 1, 1903.
Date of completion: December 31, 1908.

CONTRACT FOR IMPROVEMENT AND ENLARGEMENT OF MAIN ENTRANCE.

Name of contractor: The L. P. & J. A. Smith Company, Cleveland, Ohio.
Date of contract: November 19, 1902.
Date of approval: January 9, 1903.
Date of commencement: April 20, 1903.
Date of completion: December 31, 1907.
Extended to close of working season of 1908.

CONTRACT FOR DREDGING IN CLEVELAND HARBOR, OHIO.

Name of contractor: The L. P. & J. A. Smith Company, Cleveland, Ohio.
Date of contract: June 28, 1905.
Date of approval: August 7, 1905.
Date of commencement: July 11, 1905.
Date of completion: July 20, 1907.

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CONTRACT FOR DREDGING IN CLEVELAND HARBOR, OHIO.

Name of contractor: The Great Lakes Dredge and Dock Company, Chicago, Ill.
Date of contract: July 15, 1907.
Date of approval: July 26, 1907.
Date of commencement: July 22, 1907.
Date of completion: January 29, 1908.
Extended for a reasonable period.

COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Cleveland, Ohio, were compiled from information furnished by the collector of customs and the Bureau of Statistics, Department of Commerce and Labor:

Receipts.	Tons.	Shipments.	Tons.
Iron ore	7,355,565	Iron ore	34,670
Iron, pig	21,166	Iron, pig	30,589
Iron, manufactures	1,445	Iron, manufactures	286,288
Coal, hard	622	Coal, hard	16,495
Coal, soft	29,250	Coal, soft	3,264,575
Lumber	353,760	Coal, bunker	235,384
Salt	379	Salt	462
Copper	985	Lumber	945
Flour	1,292	Wheat	3,389
Wheat	20,670	Miscellaneous	670,347
Corn	17,028		
Oats	16,446		
Barley	4,212		
Miscellaneous	525,836		
Total	8,348,657	Total	4,533,704

Total freight tonnage:

1907	12,872,448
1906	12,247,626
Increase	624,822

Vessels.	Number.	Tonnage.
Entering	5,020	7,347,705
Departing	4,978	6,957,691
Built	4	25,705

Total registered tonnage (vessels entering and departing):

1907	14,305,413
1906	14,305,413

P P 8.

IMPROVEMENT OF FAIRPORT HARBOR, OHIO.

For a description of the location, projects of improvement, and the general conditions at this harbor, see pages 2676 and 2677, Report of the Chief of Engineers for 1898.

The reasons for extending the west breakwater to the shore are discussed in the Annual Report of the Chief of Engineers for 1903, pages 2084 to 2087, inclusive, and the form of breakwater as adopted described in the report for 1905, page 2349.

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Work was completed July 31, 1907, under contract dated July 29, 1905, with the Federal Contracting Company, of New York, N. Y., for constructing shore end of west breakwater. This work consisted of joining the inner end of the existing timber crib west breakwater with the shore by means of a rubble mound structure 1,500 feet in length.

A detailed statement showing the amount and price of materials placed in the work during the present fiscal year and the totals to date under this contract is shown in the following table:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Fascine mattress.....squares..	$26.00	.....	.....	164.4	$4,274.40
Large placed stone.....tons..	2.00	2,353.0	$4,706.00	18,003.0	36,006.00
Small riprap stone.....do....	1.50	570.0	855.00	20,864.2	31,296.30
Quarry-run stone.....do....	1.65	1,088.8	1,796.52	12,470.4	20,576.16
Total.....	.....	.....	7,357.52	.....	92,152.86

The completed portion of the west breakwater is being extended seaward under contract with the Sea Coast Construction Company, of New York, N. Y., dated September 20, 1907. This contract contemplates construction of stone filled timber crib pierhead, 50 feet square, with a concrete superstructure to be built on the east side of the harbor entrance and the construction of so much of rubble mound breakwater required for connecting this pierhead with the existing timber crib breakwater as the funds available will permit.

The work under this contract is just begun and a small amount of subaqueous construction only has been built.

A detailed statement showing the amount and price of materials placed in the work during the present fiscal year and the totals to date under this contract is shown in the following table:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Pierhead.					
Hemlock timber.....M feet..	$55.00	.....	.....	.....	.....
White-oak timber.....do....	70.00	.....	.....	.....	.....
Hardwood timber.....do....	60.00	.....	.....	.....	.....
Screw bolts and washers.....pound..	.08	.....	.....	.....	.....
Lag screws and washers.....do....	.10	.....	.....	.....	.....
Tie-rods and washers.....do....	.05	.....	.....	.....	.....
Sleeve bolts and washers.....do....	.10	.....	.....	.....	.....
Drift bolts.....do....	.06	.....	.....	.....	.....
Corner straps.....do....	.05	.....	.....	.....	.....
Spikes.....do....	.04	.....	.....	.....	.....
Concrete blocks.....cubic yard..	14.00	.....	.....	.....	.....
Concrete in mass.....do....	11.00	.....	.....	.....	.....
Quarry-run stone.....ton..	1.50	.....	.....	.....	.....
4-inch wrought-iron pipe and malleable fittings.....pound..	.04	.....	.....	.....	.....
Rubble mound breakwater.					
Quarry-run stone.....tons..	1.50	4,651	$6,976.50	4,651	$6,976.50
Large placed stone.....do....	1.50	.....	.....	.....	.....
Total.....	.....	.....	6,976.50	.....	6,976.50

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The shoaling of the outer bar at the harbor entrance was twice removed during the year by the U. S. dredge *Burton* on dates as follows: Between August 20 and 24, 1907, and between April 27 and May 20, 1908. A total of 19.168 cubic yards were removed at a field cost of $1,246.15.

Money statement.

July 1, 1907, balance unexpended		$186,185.57
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$27,868.07	
For maintenance of improvement	2,702.87	
		30,570.94
July 1, 1908, balance unexpended		155,614.63
July 1, 1908, outstanding liabilities		5,845.54
July 1, 1908, balance available		149,769.09
July 1, 1908, amount covered by uncompleted contracts		140,758.15
Amount (estimated) required for completion of existing project		245,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$245,000.00	
For maintenance of improvement	5,000.00	
		250,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

May 3, 1825	$1,000.00	July 5, 1884	$10,000.00
May 20, 1826	5,620.00	August 5, 1886	18,750.00
May 19, 1828	9,135.11	August 11, 1888	10,000.00
April 23, 1830	5,563.18	September 19, 1890	30,000.00
March 2, 1831	5,680.00	July 13, 1892	35,000.00
July 3, 1832	2,600.00	August 8, 1894	5,059.96
June 28, 1834	10,000.00	August 18, 1894	20,000.00
July 2, 1836	6,000.00	June 3, 1896	30,000.00
July 7, 1838	10,000.00	March 3, 1899	100,000.00
June 11, 1844	10,000.00	July 31, 1900 (allotment)	3,000.00
August 13, 1852	10,000.00	April 15, 1902 (allotment)	1,800.00
June 28, 1864	24,453.24	June 13, 1902	200,000.00
June 3, 1866	24,072.00	March 3, 1905	135,000.00
March 2, 1867	60,000.00	Received from other sources	208.44
June 23, 1874	20,000.00	March 2, 1907	100,000.00
March 3, 1875	15,000.00	Total	950,941.93
August 14, 1876	5,000.00	Expended to June 30, 1908	795,327.30
June 18, 1878	5,000.00		155,614.63
June 14, 1880	3,000.00		
March 3, 1881	10,000.00		
August 2, 1882	10,000.00		

CONTRACTS IN FORCE.

CONTRACT FOR CONSTRUCTING SHORE END OF WEST BREAKWATER.

Name of contractor: The Federal Contracting Company, New York.
Date of contract: July 29, 1905.
Date of approval: August 29, 1905.
Date of commencement: August 23, 1905.
Date of completion: July 31, 1907.

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CONTRACT FOR EXTENSION OF WEST BREAKWATER.

Name of contractor: Sea Coast Construction Company, New York.
Date of contract: September 20, 1907.
Date of approval: October 21, 1907.
Date of commencement: November 15, 1907.
Date of completion: June 30, 1909.

COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Fairport, Ohio, were compiled from information furnished by the collector of customs and the Bureau of Statistics, Department of Commerce and Labor.

Receipts.	Tons.	Shipments.	Tons.
Iron ore	2,738,068	Iron manufactures	155
Iron, pig	6,238	Coal, soft	389,681
Copper	308	Coal, bunker	64,109
Flour	77,441	Miscellaneous	8,824
Wheat	10,500		
Corn	4,424		
Stone	500		
Miscellaneous	23,247		
Total	2,860,726	Total	462,769

Total freight tonnage:

1907	3,323,495
1906	2,575.018
Increase	748,477

Vessels.	Number.	Tonnage.
Entering	616	1,687,029
Departing	605	1,632,267

Total registered tonnage (vessels entering and departing):

1907	3,323,495
1906	2,425,115
Increase	898,380

P P 9.

IMPROVEMENT OF ASHTABULA HARBOR, OHIO.

For a description of the localities, original conditions, and the various projects of improvement see page 2679 of the Report of the Chief of Engineers for 1898.

The present project was adopted in 1896, and was originally carried on under a continuous contract, approved June 22, 1900, with the Donnelly Contracting Company, of Buffalo, N. Y., for the construction of the two detached breakwaters provided for in the project.

After the work was about 63 per cent completed the contractors failed and a new contract was made with their sureties, the United

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States Fidelity and Guaranty Company, which contract was approved October 11, 1905.

The work has been advanced 13 per cent during the present fiscal year and is now 90 per cent completed. It is believed that this contract will probably be completed during the present working season.

Under this contract the pierheads and 500 linear feet of the west breakwater have been completed and 900 linear feet, additional, is practically complete. Five hundred linear feet of the east breakwater has been completed and the remaining 700 feet varies in height from 0 to 5 feet above the water surface.

The following table gives a detailed statement of the work done:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Two pierheads (complete)					$36,058.17
West breakwater.					
Heavy riprap, tons	$1.43			40,583	58,033.70
Core filling, do	.77			70,065.5	53,950.44
Small stone, do	1.16			48,517	56,279.72
Paving stone, do	2.09			5,373	11,229.57
Quarry-run stone, do	1.43	23,929.1	$34,218.61	23,929.1	34,218.61
Total			34,218.61		213,712.04
East breakwater.					
Heavy riprap, tons	1.43			16,418.6	23,478.59
Core filling, do	.77			44,667.2	34,393.74
Small stone, do	1.16			31,221	36,216.30
Quarry-run stone, do	1.43	15,779.3	22,564.40	22,279	31,858.97
Total			22,564.40		125,947.60
Grand total			56,783.01		375,717.81

A contract with the Federal Contracting Company, of New York, for constructing the shoreward end of the west breakwater was completed June 6, 1908. This work consists of 1,300 linear feet of rubble mound construction on the line of prolongation of the existing west breakwater from the inner end of the present timber crib work.

The following table gives a detailed statement of the amount and price of the materials placed in the work:

	Contract price.	Fiscal year 1908.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.
Large placed stone, tons	$1.80	21,157.3	$38,083.14	25,881.7	$46,587.06
Quarry-run stone, do	1.42	12,083.1	17,158.00	52,724.9	74,869.35
Shale, cubic yards	.70			20,993.5	14,695.45
Sand, do	.40			12,687.1	5,074.84
Total			55,241.14		141,226.70

In 1904 the Secretary of War, under authority of law, gave permission to the Pittsburgh, Youngstown and Ashtabula Railroad Company to completely remove the west jetty and to replace the same by a bulkhead 60 feet farther to the west, thus increasing the width of the channel. Under the authority granted by this permit the railroad company has practically completed its fill on the lake front, protecting the

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fill on the north side by a wall of riprap, and has completed a new dock on the lake front west of the channel 1,000 feet long, and the sea wall to the westward about 1,200 feet long, to protect the new dock, and the new slip is now being dredged to 21 feet.

In May, 1906, authority was also granted to the Lake Shore and Michigan Southern Railway Company to make certain improvements on the westerly side of the river. The railroad company is to take possession of the east pier and to extend it northward 720 feet. Thence there will be an extension of about 900 feet easterly, thence southward to meet the property of the railway company. The inclosure will be filled to the level of the dock. The Government east breakwater will afford but partial protection to these new docks. The railroad company has been authorized to extend the east breakwater to protect the docks on the easterly side. Work on this improvement was begun in June, 1906, and has been continued since.

This railway company has extended the east pier 720 feet and thence easterly about 900 feet and southerly to a point meeting their property, and has filled the space, reclaiming about 15 acres of land. The old opening of the Minnesota slip has been closed and the easterly side of the slip has been extended to the established harbor lines, about 3,350 feet of cribwork being completed, and about 7 acres having been filled in to the eastward. A sea wall at the easterly end of their improvements has been completed for 1,360 feet. The east breakwater extension has been completed for a distance of 1,100 feet, the abandoned breakwater has been removed and the east basin and slip have been dredged to 23½ feet.

Money statement.

July 1, 1907, balance unexpended		$262,876.45
Received from sales		23.30
		262,899.75
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$116,606.78	
For maintenance of improvement	1,075.73	
		117,682.51
July 1, 1908, balance unexpended		145,217.24
July 1, 1908, outstanding liabilities		14,235.62
July 1, 1908, balance available		130,981.62
July 1, 1908, amount covered by uncompleted contracts		46,535.66

APPROPRIATIONS.

May 26, 1826	$12,000.00	February 9, 1859	$809.65
May 19, 1828	2,403.50	June 23, 1866	24,708.82
March 3, 1829	6,940.25	March 2, 1867	54,000.00
March 2, 1831	7,015.00	March 3, 1871	15,000.00
July 3, 1832	3,800.00	June 10, 1872	15,000.00
March 2, 1833	3,400.00	March 3, 1873	16,000.00
June 28, 1834	5,000.00	June 23, 1874	35,000.00
March 3, 1835	7,591.00	March 3, 1875	25,000.00
March 3, 1837	8,000.00	August 14, 1876	5,000.00
July 7, 1838	8,000.00	June 18, 1878	12,000.00
June 11, 1844	5,000.00	March 3, 1879	9,000.00
August 30, 1852	10,000.00	June 14, 1880	20,000.00
March 3, 1853	42.64	March 3, 1881	20,000.00

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APPROPRIATIONS—continued.

August 2, 1882	$20,000.00	June 13, 1902	$200,000.00
July 5, 1884	22,500.00	June 28, 1902	200,000.00
August 5, 1886	30,000.00	March 3, 1903	118,000.00
August 11, 1888	25,000.00	March 3, 1905	20,000.00
September 19, 1890	40,000.00	Received from other sources	3,557.05
July 13, 1892	70,000.00	March 2, 1907	20,000.00
August 18, 1894	75,000.00		
June 3, 1896	50,000.00		
March 3, 1899	50,000.00	Total	1,392,626.36
June 6, 1900	110,000.00	Expended to June 30, 1908	1,247,409.12
July 2, 1900 (allotment)	3,000.00		
March 3, 1901	2,000.00	Balance	145,217.24
April 30, 1901 (allotment)	2,858.45		

CONTRACTS IN FORCE.

CONTRACT FOR CONSTRUCTING EAST AND WEST BREAKWATERS.

Name of contractor: The United States Fidelity and Guaranty Company, Baltimore.
Date of contract: August 26, 1905.
Date of approval: October 11, 1905.
Date of commencement: August 20, 1905.
Date of completion: Close of working season of 1906.
Extended for a reasonable period.

CONTRACT FOR CONSTRUCTING SHOREWARD END OF WEST BREAKWATER.

Name of contractor: The Federal Contracting Company, New York.
Date of contract: July 29, 1905.
Date of approval: August 29, 1905.
Date of commencement: August 11, 1905.
Date of completion: June 6, 1908.

COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Ashtabula, Ohio, were compiled from information furnished by the collector of customs and the Bureau of Statistics, Department of Commerce and Labor:

Receipts.	Tons.	Shipments.	Tons.
Iron ore	8,470,347	Iron ore	5,000
Lumber	15,000	Coal, hard	11,261
Miscellaneous	70,200	Coal, soft	2,016,271
		Coal, bunker	219,267
		Lumber	23,995
		Miscellaneous	2,519
Total	8,555,547	Total	3,279,053

Total freight tonnage:

1907	11,834,580
1906	10,314,129
Increase	1,520,451

Vessels.	Number.	Tonnage.
Entering	2,036	5,118,557
Departing	2,054	5,145,908

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Total registered tonnage (vessels entering and departing):	
1907	10,264,465
1906	9,058,215
Increase	1,206,250

P P 10.

IMPROVEMENT OF CONNEAUT HARBOR, OHIO.

The project for the improvement of this harbor was adopted in 1896, and is given in full on pages 2970 and 2971 of the Report of the Chief of Engineers for that year.

The latest contracts in force for work at this harbor were completed during the previous fiscal year.

During the months from July to November, inclusive, 1907, minor repairs were made to the concrete superstructure of the east breakwater. The work was done by hired labor, and purchase of materials was made in open market at a field cost of $6,685.33.

Between May 22 and June 6, 1908, the U. S. dredge *Burton* removed shoals which had formed in the channel, and 16,242 cubic yards of material were excavated at a field cost of $1,055.89.

Money statement.

July 1, 1907, balance unexpended		$66,398.74
Collection on account of damage to pier, etc		3,002.00
		69,400.74
June 30, 1908, amount expended during fiscal year:		
For maintenance of improvement	$8,962.13	
For Isthmian Canal Commission	[a] 44.14	
		9,006.27
July 1, 1908, balance unexpended		60,394.47
July 1, 1908, outstanding liabilities		19,968.04
July 1, 1908, balance available		40,426.43

APPROPRIATIONS.

March 3, 1829	$7,500.00	August 18, 1894	$40,000.00
April 23, 1830	6,135.65	June 3, 1896	40,000.00
March 2, 1831	6,370.00	March 3, 1899	100,000.00
July 2, 1832	7,800.00	July 2, 1900 (allotment)	3,000.00
July 2, 1836	2,500.00	March 20, 1901 (allotment)	2,068.20
March 3, 1837	5,000.00	June 13, 1902	200,000.00
July 7, 1838	8,000.00	March 3, 1903	10,000.00
June 11, 1844	5,000.00	April 28, 1904	240,000.00
August 30, 1852	10,000.00	March 3, 1905	60,000.00
June 23, 1866	20,513.74	Redeposited November 22, 1904	1,000.00
March 2, 1867	10,000.00	Received from other sources	3,852.63
April 10, 1869 (allotment)	8,910.00	March 2, 1907	20,000.00
June 11, 1870	6,000.00		
March 3, 1873	400.00		
June 23, 1874	1,500.00	Total	872,550.22
March 3, 1875	1,000.00	Expended to June 30, 1908	812,155.75
June 14, 1880	6,000.00		
July 13, 1892	40,000.00	Balance	60,394.47

[a] To be refunded.

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COMMERCIAL STATISTICS.

The following statistics for the year 1907, relative to the commerce of the harbor of Conneaut, Ohio, were compiled from information furnished by the collector of customs and the Bureau of Statistics, Department of Commerce and Labor:

Receipts.	Tons.	Shipments.	Tons.
Iron ore	6,580,526	Iron, manufactures	17,574
Iron, manufactures	13	Coal, hard	500
Lumber	133	Coal, soft	965,002
Flour	40	Coal, bunker	786,387
Corn	17	Oats	24
Oats	115	Miscellaneous	629
Miscellaneous	467		
Total	6,581,311	Total	1,770,066

Total freight tonnage:

1907	8,351,407
1906	7,063,069
Increase	1,288,338

Vessels.	Number.	Tonnage.
Entering	1,538	4,183,869
Departing	1,538	4,183,869

Total registered tonnage of vessels (entering and departing):

1907	8,367,738
1906	8,131,846
Increase	235,892

P P 11.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

Tug McCormick.—An allotment of $1,500 was made for the removal of the wreck, and after due notice bids were opened and a contract awarded to Walter V. Metcalf, of Cleveland, Ohio, to remove the wreck. The removal was accomplished at a total cost of $293.73, including cost of inspection.

Dump scow.—An allotment of $1,000 was made for the removal of the wreck. After due notice bids were opened for the removal of the wreck. All bids were rejected as being too high, and the U. S. dredge *Maumee* was ordered to remove the wreck, which was successfully done at a cost of $728.85.

CONTRACTS IN FORCE.

CONTRACT FOR REMOVAL OF WRECK OF TUG M'CORMICK.

Name of contractor: Walter V. Metcalf, Cleveland, Ohio.
Date of contract: August 15, 1907.
Date of approval: August 31, 1907.
Date of commencement: August 16, 1907.
Date of completion: August 25, 1907.

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